GAS

FEBRUARY 1961

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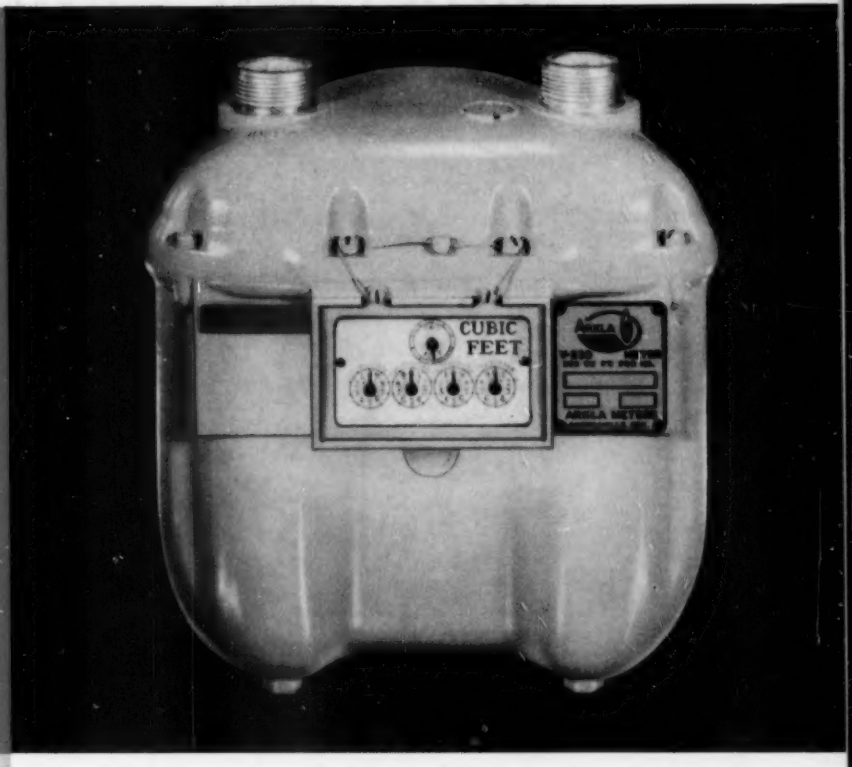

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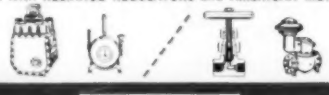

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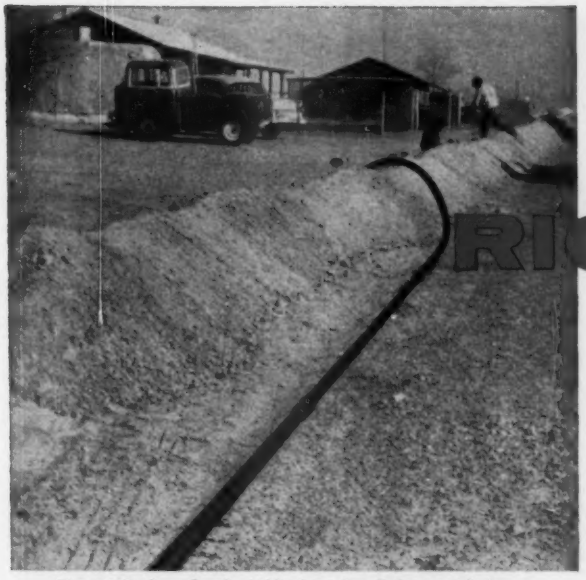

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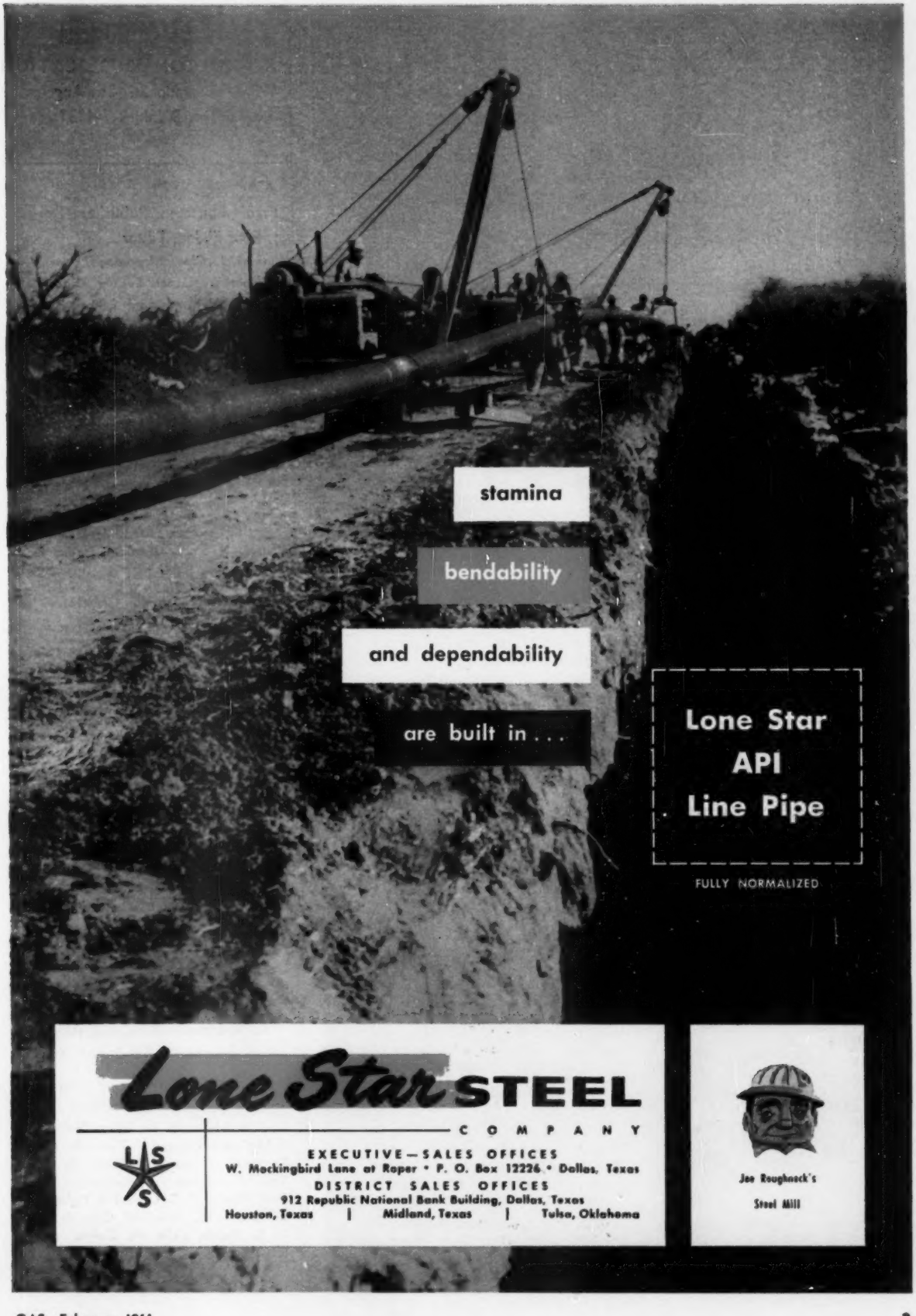
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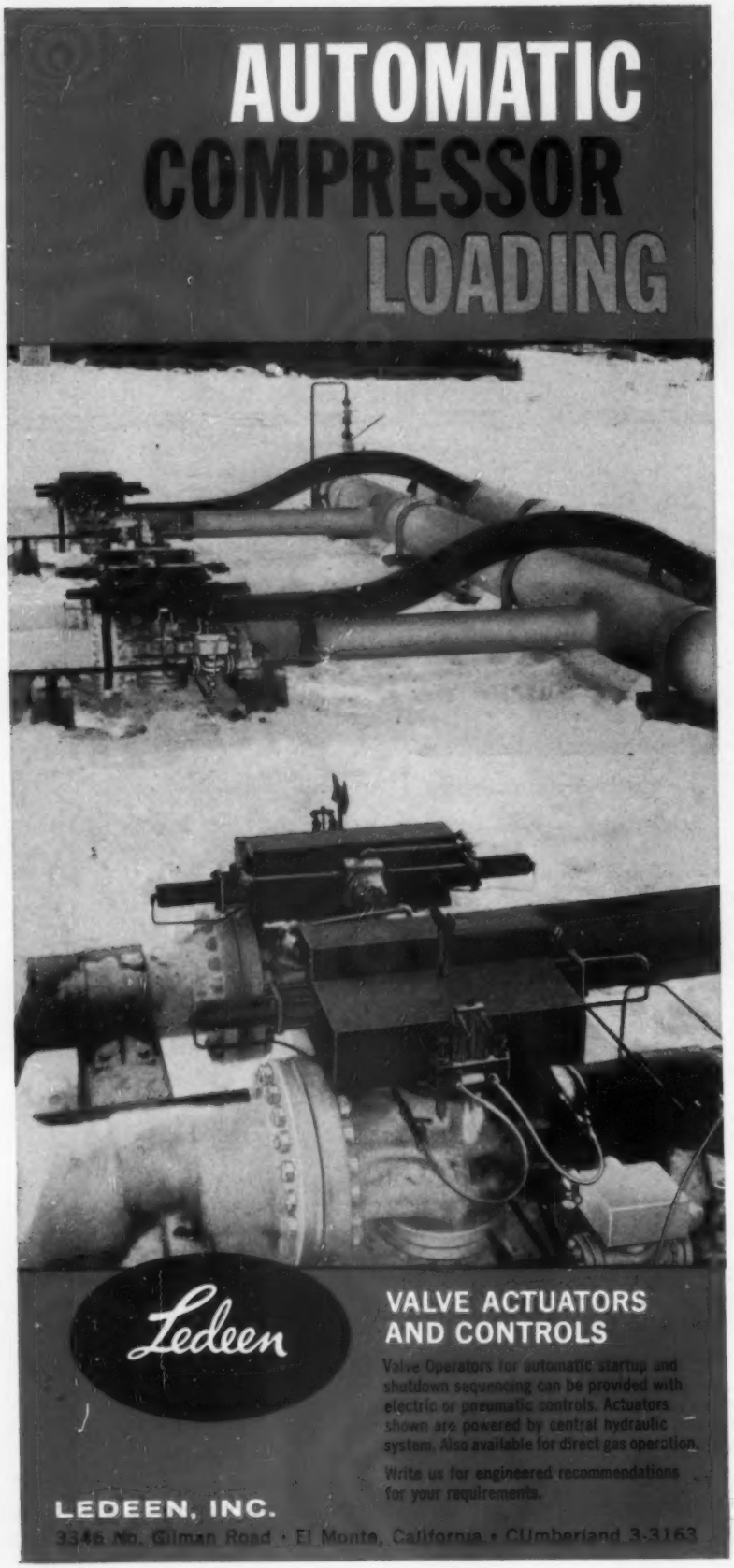
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CALENDAR

February

9-11..AGA Home Service Workshop — Cleveland - Sheraton Hotel, Cleveland, Ohio.

13-14..2nd Biennial Mid-Pacific Gas Merchandising Conference — Hawaiian Village Hotel, Honolulu.

23-24..PCGA, AGA, CGA Joint Public Relations Conference — Benson Hotel, Portland, Ore.

March

13-17..National Association of Corrosion Engineers Annual Meeting Hotel Statler, Buffalo.

16-17..New England Gas Association Annual Meeting — Statler-Hilton Hotel, Boston.

20-22..AGA General Management Section Conference—Frances-Marion Hotel, Charleston, S. C.

27-28..Mid-West Gas Association Annual Meeting — Sheraton-Fontenelle Hotel, Omaha.

April

4-5..Gas Compressor Institute—Liberal, Kan.

4-6..AGA Research & Utilization Conference—Sheraton Cleveland Hotel, Cleveland.

11-13..AGA Sales Conference on Industrial & Commercial Gas — Prince Edward, Windsor, Ont., Canada

13-15..GAMA Annual Meeting—Boca Raton, Fla.

18-20..Southwestern Gas Measurement Short Course — University of Oklahoma, North Campus, Norman, Okla.

24-26..Southern Gas Association Annual Meeting—New Orleans.

May

8-12..AGA Operating Section, Distribution & Production Conference, —Sheraton Hotel, Philadelphia.

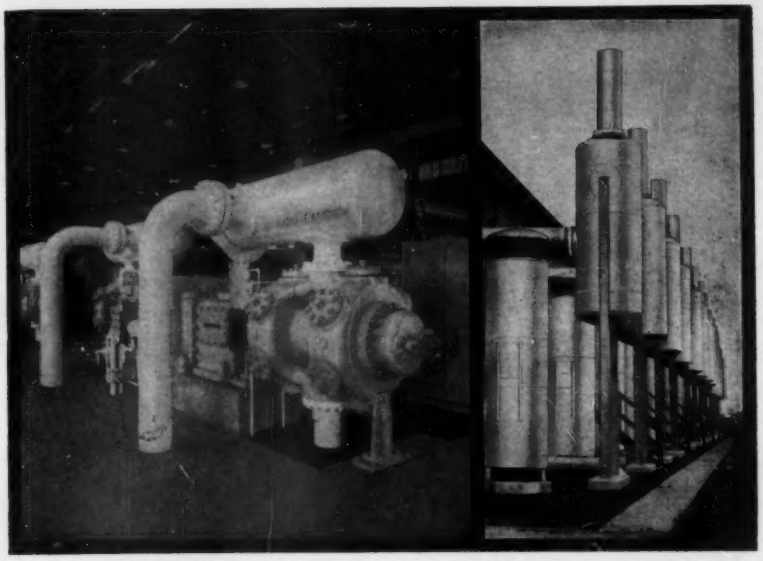
15-17..AGA MidWest Regional Gas Sales Conference — Edgewater Beach Hotel, Chicago

25-26..AGA Operating Section, Transmission Conference—Brown Palace and Cosmopolitan Hotel, Denver.

June

20-24..Canadian Gas Association Annual Meeting—Banff Springs, Alberta.

26-27..Michigan Gas Association Annual Meeting—Grand Hotel, Mackinac Island, Mich.



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GAS

FEBRUARY 1961

Thermally Thinking

Good Luck!

WE want to extend a tardy "Happy Inauguration" to President Kennedy and wish him well in office. He landed himself a tough job; a real man-killer. The presidency, these days, is something like working on a pipeline spread's dope gang. Even when you are making fine progress, it is most likely you are still losing a little hide.

Our new President seems to have welcomed a few swipes at his political hide early in the game. I refer, of course, to when Mr. Kennedy reached outside his own family to appoint James McCauley Landis as a special assistant. The Messrs. Kennedy and Landis make no secret of their desires to insert a fast-stirring spoon into Washington's oft-simmering kettle of alphabet soup—independent regulatory agencies, such as ICC, CAB, FCC, FTC, SEC, NLRB, and FPC.

Since our feature interest is more closely tuned to Federal Power Commission, and since it seems to be a matter of every regulatory agency for itself anyway, we'll treat just FPC in this writing.

Federal Power Commission seems destined for a little overhauling by the Kennedy administration, à la the "Landis Report." Too, its author's appointment as a White House "czar" of regulatory agencies signals bringing FPC under closer White House control.

These things, however, are not really news to consistent readers of my favorite gas-industry magazine. Our Washington editor, Neil Regeimbal, started calling the shots on such bits of political fast-footwork months and months ago.

Regeimbal consistently picks his way through and behind the Washington scene with alacrity. His only pace is all-out. Zipping alarmingly among the three branches of government, regulatory agencies, and bashes and bureaus that are Washington, Regeimbal is on the scene every day bringing the pacts and prescience of politics and government to GAS' readers. We are proud of the job he does for GAS. We commend your attention to his Washington column each month. And Neil is just one of our (Chilton Co.'s) four-man, full-time Washington Bureau—headed by the able, and not inaudible, George Baker.

To return, many Congressmen are semi-permanent fixtures in Washington. Some look on themselves, after 20 or 30 years in the House or Senate, as cornerstones of federal government. As such, they are not inclined to freely lend functions and powers of the Legislative to the Executive branch.

Senior Representatives and Senators see presidents as rather Johnnies-come-lately. Chief Executives take over for four or eight years, then depart. But some Congressmen stay on and on as the presidents come and go.

We expect more than a little jealous recalcitrance as the fellow over in the White House seeks relinquishment of traditional oversight of FPC by the Legislative branch. Kennedy-Landis reforms (see Regeimbal's "Washington" in this issue) will also fling fermentation into the halls of Congress.

Federal Power Commission is right in the middle. Created in 1920 and established as an independent agency by Congress in 1930, it has tried to regulate the gas industry under the Natural Gas Act, from Congress, of June 21, 1938, as amended. Since that Act was passed, an awful lot of gas has gone down the pipeline. The lawmakers did not, could not, foresee our industry then as it did develop to today. FPC sought repetitiously legislative recommendations to modernize, clarify, and expedite its functioning. Congress conceded little cognizance.

Courts battered and sometimes confused as they interpreted vague intents of the ancient (in parts) Natural Gas Act. And FPC has not been free of errors, even as you and I.

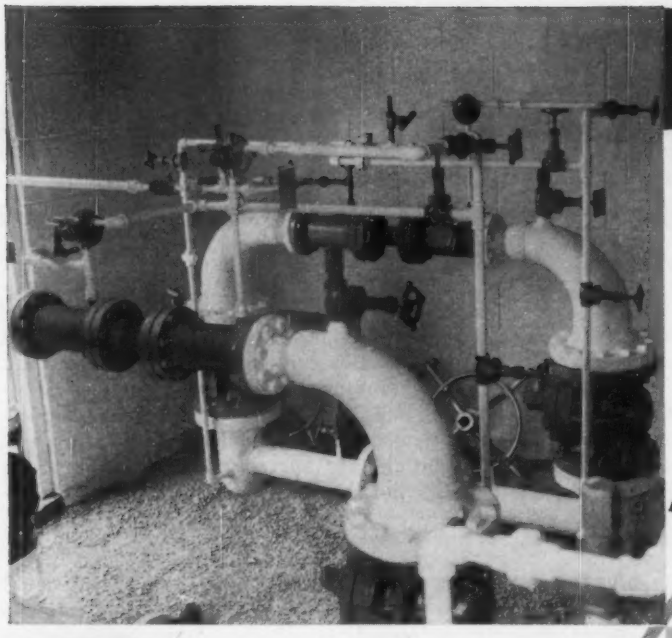
During the next four or eight years, changes will be made. We will say "ave atque vale" to commissioners, some staff, and regulatory procedures we have learned to know, if not love.

We must remember, however, during the past 10 years under an evolutionary regulatory climate, the gas business has made progress. The gas industry's fast, fantastic growth has astounded the hemisphere while bringing gas service to some 33-plus million customers.

The new Administration's approach will be charged by the public and gas industry to do at least as well.

J. Fred Ebsen

EDITOR



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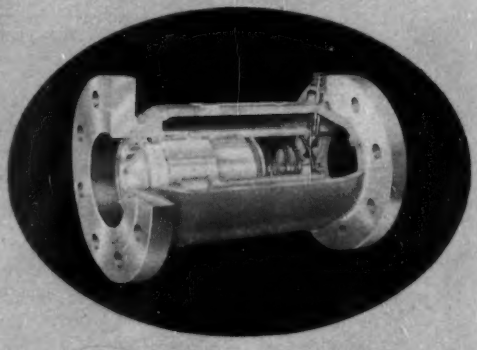

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GAS HIGHLIGHTS

Mexico bustling with projects

Since revealment of Enchilada Inch plans, several other similar projects have sprung up. None is taken too seriously by industry pundits. Some note is being taken of International Gas Co., Los Angeles, which might be making points with the Mexican government, rather than Pemex. International could be standing in good position with a replacement project should Pemex and U. S. backers of the Texas-Mexico-California pipeline hit an insurmountable obstacle. However, no real stumbling blocks have been brought to surface, to date, other than expected strong opposition and normal complications of a big international project.

New Canadian taxes cast doubt

U. S. gas pipeline companies, investment bankers, and institutional investors have been taking a new look at the Canadian natural gas business. Canada suddenly increased withholding taxes on Canadian subsidiaries of foreign corporations. The increase was from 5 to 15 per cent. It is considered a blow to U. S. investors and may hazard some plans for gas industry expansion now planned in Canada. Other blows were also struck—increased duty on gas and oil country equipment and supplies, for example—and additional important moves are due from this session of Parliament.

165 communities get gas in '61

Natural gas will flow to 103 communities in Iowa; 43 in Minnesota; 14 in South Dakota; 4 in Nebraska, and 1 in Illinois—for the first time this year. Northern Natural Gas (Omaha) will expand its system to render the service. A construction program involving 1200 miles of branch lines will be started by Northern early this year.

110 million gas appliances work away

AGA reports that nearly 110 million gas appliances are being used by U. S. homemakers (and their husbands—Ed.). A year ago, the statistics stood at less than 107 million. The appliances are used by some 40 million residential gas customers. All 50 states are involved. Some 31 million of these customers have utility-type service; 9 million use LPG with bottle or tank service. In breakdown form, gas appliances look like this: 12,925,000 central heating units; 24,050,000 space heaters; 6.8 million wall and floor furnaces; 34,025,000 gas ranges; 24,725,000 water heaters; 3.2 million gas refrigerators; 3,250,000 clothes dryers; 550,000 disposers; 300,000 gas lights; and 32,000 central air conditioning systems.

FPC sets area price hearing

March 6 was set for a prehearing conference (Midland, Texas) that will lead to an evidentiary record hearing to determine an appropriate price level for natural gas out of the Permian Basin area and Texas Districts 7(c) and 8. An area rate hearing for southern Louisiana production is planned for the near future.

Compromise offered in Detroit gas case

Panhandle Eastern Pipeline Co. offered to compromise its long, long fight with Michigan Consolidated Gas Co. to end a delivery of 127 MMcfd to the latter company. In the offer, Trunkline Gas Co., a Panhandle affiliate, would deliver 100 MMcfd to Mich-Con from April-October. The plan was handed FPC. Panhandle wants permission to go ahead with a $77 million expansion program. Mich-Con doesn't think much of the offer. Panhandle still wants to make the direct industrial sale to Ford Motor Co.'s River Rouge plant.

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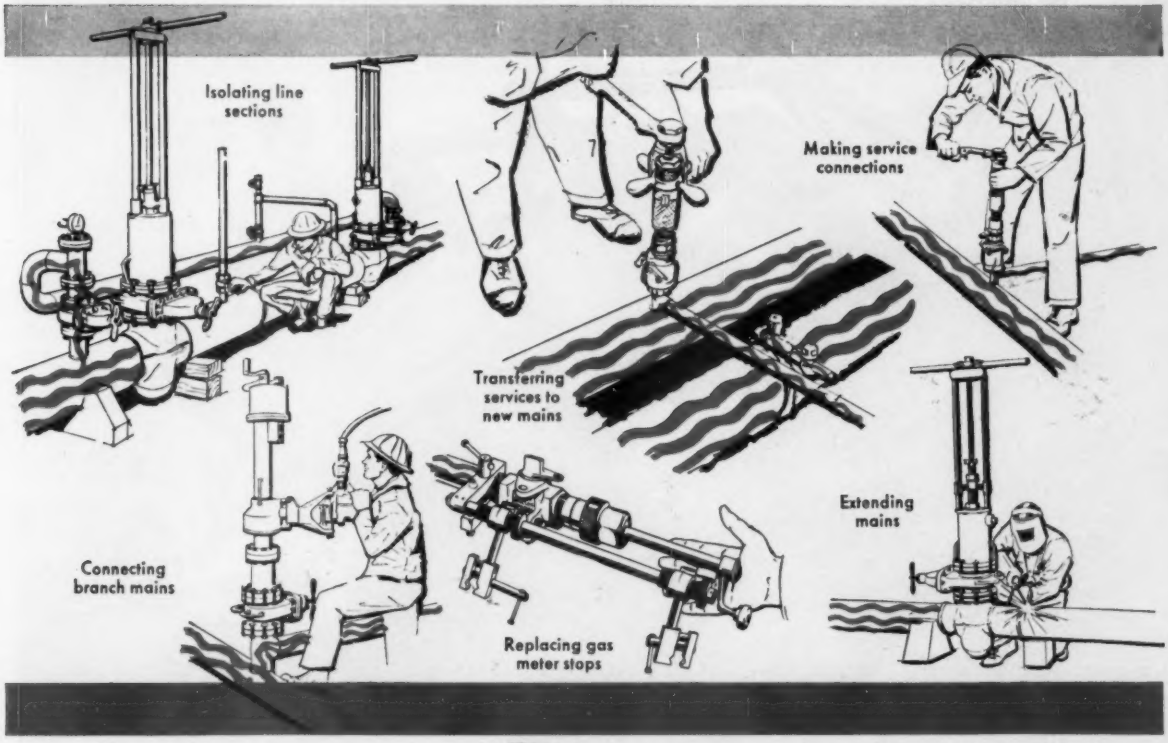

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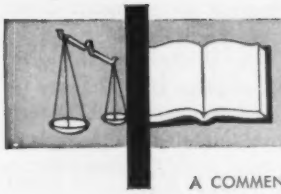

Regulatory and Legislative Trends

A COMMENTARY ON NATIONAL AND STATE DEVELOPMENTS BY AN EXPERT IN UTILITY LAW

A utility commissioner's philosophy

THE body of principles or general conceptions underlying regulations of public utilities and a commissioner's attitude and conduct in applying principles are important. A multi-billion dollar gas industry's health depends greatly upon the philosophy of commissioners who regulate the public utility business.

Regulation of public utilities is a substitute for destructive competition. The objectives of regulation are to ensure good and non-discriminatory service to the customers at reasonable prices. Commissioners and the public need to know limitations of utility commission control over economic conditions that cause increasing rates in some industries and diminishing services in others. Commissioners do not have direct control over the cost of labor, materials and money for example. They must, however, recognize cold, hard economic facts in regulating utilities. The address by Commissioner David M. Brackman of Massachusetts on "Duties and Responsibilities of a Public Utilities Commissioner" is very informative. He made the following points in speaking to the convention of the National Association of Railroad and Utilities Commissioners:

• History of regulation

Although regulation today is primarily the exercise of administrative control, creation of regulatory commissions was preceded by years of attempts by other less successful methods. Railroad regulation came before regulation of all other utilities. The earliest form was by special charters granted by legislatures. These charters authorized railroads to enter the business, but often imposed conditions on the exercise of corporate powers.

Lack of uniformity produced by this type of grant led to a period of regulation by general statute. This method too proved unsuccessful, largely because it lacked adequate enforcement and flexibility of approach.

In 1871 Illinois became the first state to establish a commission with regulatory power over railroads. Empowered only to deal with safety and service. it later was given control of rates. The commission form of regulation was upheld in the famous case of *Munn v. Illinois*, 94 U. S. 113 in 1876. Many states followed the lead of Illinois. The culmination of this early period was, perhaps, the landmark enactment of the Interstate Commerce Commission Act in 1887.

Regulatory commissions in those early days were dealing with a transportation system in its infancy. Problems facing the commissions were those generated by growth. These problems may be contrasted with those of a stable and perhaps a declining transportation industry with which the commissions deal at the present time.

Regulation over railroads has been expanded to include gas, electric, telephone, telegraph and water utilities, motor carriers and a host of miscellaneous functions.

• Characteristics of commissioners

Mr. Brackman told the NARUC convention that:

"The present day commissioner is foremost an expert in regulation itself. The qualities necessary are those most characteristic of the judiciary. No judge can be expert in the subject matter of all the varied types of actions coming before him—from anti-trust actions involving complex economic problems to tort actions, with predominantly medical testimony. The commissioner, like the judge, must become skilled in the process of judgment.

"If one quality can be said to be most basic in this process, that quality must be objectivity. In the case of a commissioner, objectivity is not merely the maintenance of impartiality between litigants but something considerably more complex. The regulatory statutes which he administers have a definite point of view; they represent a policy judgment of the necessity for control over certain individuals and companies. Clearly, under these circumstances, objectivity is something considerably more than mere impartiality.

"On the other hand, the power of regulatory commissions is itself subject to limitations. The purpose of regulation is to attempt to simulate the situation which would obtain if the industry regulated were not a monopoly—regulation is, as it were, a substitute for competition. And as such it is charged with the responsibility of exercising its judgment not just to control prices, but also to encourage the best long-range results for the public. Society benefits most if regulation serves also to encourage research, innovation and growth. It fails in its public responsibility when it succumbs to the temptation to sacrifice the future for the present."

Duties and responsibilities of a commissioner begin with knowledge of those standards and an understanding of their place in the regulatory process.

No commissioner can be expert in operations of all industries with

which he is concerned. Regulation cannot, however, proceed in a vacuum. The connection between operations of a business and the form which regulation takes is so intimate that knowledge of the fundamentals of each industry is a necessity.

• Administrative procedure

It is only in recent years that there has been general concern for the manner in which decisions are made, as distinct from the content of decisions. The Administrative Procedure Act of the federal government has produced a useful standard.

The necessity for affording an opportunity for a fair hearing, the authority of hearing officers, the relationship of the staff to the commission, the type of evidence needed to support decisions, and the conduct of commissioners in the decision making process itself, are matters confronting commissioners. They are, therefore, primarily responsible for assuring that the administrative process is fair.

One aspect of the procedural problem recently received much notoriety—ex-parte contacts of commissioners with regulated companies. Here again, the guides of fairness and uniformity of application are appropriate.

• Economic forces beyond commissioners' control

The commissioner has a responsibility to understand, says Mr. Brackman, and to make clear to the public, the relation between problems within jurisdiction of the commission and those which, although related to regulation are not subject to regulatory control.

Recent proceedings have dealt with efforts of railroads to shed some of their more uneconomical and burdensome responsibilities. The prime example is the effort of eastern railroads to curtail passenger service which has produced substantial deficits. The commissions must treat each matter with utmost seriousness and handle each case on its own particular merits. They must assess the public need for the particular service sought to be discontinued against the burden which it imposes on the railroad. It must, nevertheless, be recognized that each of these proceedings is a fragment of the evolution that has taken place in public and private transportation.

The monopoly position of railroads has in our generation been undermined by competition from highway and air passenger transportation, plus private automobiles, and in the case of freight by the trucking industry. These forces have created a problem that cannot be solved by the regulatory process, which acts by restraints placed on the regulated utility. The commission can impede, or hasten, the elimination of railway passenger service, but it cannot assure its continuance in the face of the impact on it of the desire of the people to use their own vehicles.

Another example of a basic problem that is beyond regulatory control is found in rate matters of gas, electric, water and telephone utilities. These have contributed numerous cases to public utility commissions in recent years. Commencing after World War II and continuing until the present time, rates of these utilities have been steadily increasing. The increases have been through automatic price adjustment clauses, such as fuel clauses in the case of electric and gas companies, or through rate increases granted by commissions. Another example is found in the effect of inflationary trends and increased cost of labor and materials on companies subject to utility commission regulation. The function of the commission in these cases has been one of limiting the amount of increases sought by utilities.

Here again, causes for higher costs of facilities and operations are beyond control of commission jurisdiction. Basic among these is the steady and substantial increase in the general level of prices. Utility companies use labor and materials and have experienced the same cost rises that have burdened consumers generally. In addition, a large part of revenues must be used to pay taxes imposed on the companies. Approximately 50 per cent of every utility rate increase represents the portion that must be paid by the company to the federal government. Local taxes have increased as much as 100 per cent in the last 15 years. The effect of price level changes on operating expenses, which constitute approximately 80 to 90 per cent of total utility expenditures, is wholly beyond control of public utility commissions.

This inflationary trend has occurred during the time when a huge amount of new investment in utility plant became necessary. Many utility companies that were large companies then, have doubled and almost tripled in size since the end of World War II. Demand for utility services has grown at an unprecedented rate even though the price of the services has been increasing steadily during the same period. Increased demand has its effect on the price of the services. Each dollar of new investment purchases a decreasing amount of plant. This increase in cost of facilities to meet growth must be reflected in the rates.

The increased use of utilities services is a reflection of the higher level of a general consumption of goods during the period. A less well recognized reason for demands by the public is that utility services are an excellent bargain. The general level of prices affecting cost of living has increased at a much greater rate than prices of utilities services.

In light of these factors, what are the responsibilities of a public utilities commissioner? Commissioner Brackman answered that "he must continue to seek objective standards for the resolution of the matters which come before him, notwithstanding that the ultimate causative factors are beyond his control."

In the case of utility rate making, effort must be made to treat objectively the effects of inflation. In recent years, commissions have recognized "attrition" and assessed the effect of new investment at higher prices on revenue requirements. Similarly, there has been an awareness that the rate of return permitted a utility is itself in the nature of a price of capital that the company must purchase

Continued on page 104

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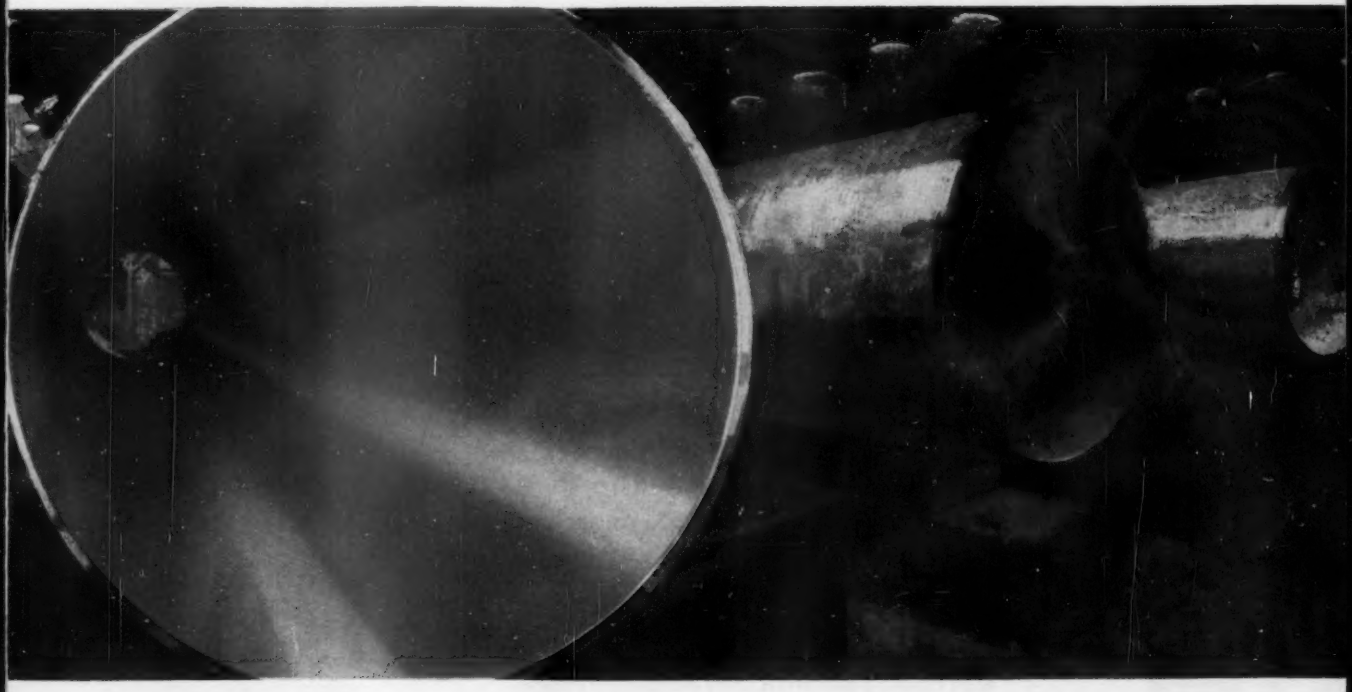

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TECHNICAL TRENDS

By GUY CORFIELD
Professional Engineer,
Los Angeles

The Effects of Electrical Shock on Man

A very interesting and informative bulletin with the above title has been issued by the U. S. Atomic Energy Commission, Safety and Fire Protection Branch, Office of Health and Safety.

The preface explains that "in the atomic energy industry, accidental human contacts with electrical energy account for one-third of the fatal injuries. The bulletin is a reprint of a paper by Charles F. Danziel of the University of California.

In Mr. Danziel's introduction he states that "Beyond a doubt, electricity is potentially the most dangerous commodity in general use by the public. The small number of electrical fatalities undoubtedly is due to the general recognition that electricity is inherently dangerous . . . knowledge of the possible effects of electric current on man is the starting point at which to incorporate safety into the design of electrical equipment . . . in explaining and justifying safety regulations, safe work procedures, rescue and resuscitation methods . . . in the general education of the public in the proper use of appliances and machines . . . diagnosis and treatment of accident victims . . . the ratio of fatalities to injuries for electric shock victims is very high in comparison to the corresponding figure for all other accidents . . . however . . . victims who survive the first effects of serious electrical accidents often recover without permanent disability."

While high voltage is thought by many to be the controlling factor in electrical accidents, it is actually current flowing through the body which is harmful and upon which criteria of danger are based. Data are not precise, for what could be a harmless exposure to most people may be a fatal shock to the nervous system or weak heart of susceptible individuals. There are also some who are able to withstand a much higher exposure than the average. Tests and observations on many subjects both human and animal have developed, however, the average reaction of men and women to electrical current in terms of threshold perception through to fatality.

The threshold perception (smallest current that can be felt) by contacting metal terminals with moist hands was found to be as follows: for men, with 60 cycle alternating current, 1.1 milliamperes; with direct current, 5.2 milliamperes; for women, about two-thirds of these values. AC gives a tingling sensation, and dc a feeling of warmth. As ac frequency is increased, beyond about 100 cycles per second, it takes more current to produce perception, the value at 1000 cps being about double that at 100 cps.

With increasing ac current, tingling gives way to contraction of the muscles, with sensation of pain and decreasing muscular control to the point at which the subject cannot release his grasp of the conductors. At this point he is said to "freeze" to the circuit, and the maximum current he can tolerate and still disengage his hold is termed the "let-go" current. For men, the ac 60 cycle let-go current averaged 15.9 milliamperes and, again, the value for women was about two-thirds this figure; also, again, greater current could be tolerated as the frequency was increased, 1000 cps allowing about 50 per cent more current than 100 cps.

Gradually increasing direct current produced sensation of heat rather than muscular contraction, but sudden changes in current magnitude resulted in powerful muscular contraction and interruption caused very severe shock. A point was reached, with progressing increase in dc current, at which disengagement produced severe pain and shock beyond which the test subjects refused to go. This has been termed the "release" point, and the release current for men was found to average 76.1 milliamperes. Applying the apparent two-thirds value for women would give 50.7 milliamperes.

Even though current is believed to be the important criterion, "in accidents the voltage of the circuit is usually the only electrical quantity known with certainty." Comparable tests indicated that with contact to wet unbroken skin, let-go voltage 60 cycle ac was 21 volts hand to hand and 10 volts hand to feet; dc release values were 104 volts hand to hand and 51 volts hand to feet.

Apparently the "let-go" and "release" currents are the point of danger and any values beyond them could be fatal—in fact, prolonged exposure even at the let-go or release levels might be decidedly harmful if not actually fatal. The bulletin states:

"The higher 60 cycle let-go currents were frequently sufficient to stop breathing during the period the current was flowing across the chest, and the reactions at the instant of current interruption during the dc release tests occasionally threw the subject a considerable distance. The muscular reactions during accidents frequently cause fractures, and the contractions resulting when a victim grasps bare overhead wires may be sufficient to freeze him suspended to the circuit in spite of his struggle to drop free. In many accidents the victim frees himself by breaking the conductor, or his body weight may assist him in interrupting the circuit; however, fortuitous circumstances must not be relied upon to provide safety to human life. . . ."

This bulletin is informative for everyone regardless of the nature of their private pursuits and vocation. It can be obtained from the Superintendent of Documents, Government Printing Office, Washington 25, D. C., at a cost of 20 cents.

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WASHINGTON

By NEIL REGEIMBAL
GAS Washington Bureau
1093 National Press Bldg.
Washington 4, D. C.

Look for rough treatment ahead

THE gas industry is in for some rough treatment in the headlines. Producers and pipelines will suffer particularly. But so will distributors, as part of the broad industry image.

The controversy first predicted by this column for the Federal Power Commission two years ago is beginning to swirl. It'll be a real whirlpool before any semblance of calm is restored.

One of the first real interfamily fights between the Kennedy Administration and the Democratic congressional leaders may well erupt over this hapless agency. The seeds have already been sown.

Eventually, there'll be some major shakeups in the agency's system, procedures, perhaps even its statutory authorities. It'll be a rough and tumble fight before changes emerge. The gas industry will be right in the middle of it.

President Kennedy made it clear from the beginning that he had his eye on all regulatory agencies, and that some changes would be made. But it is clear now that the power commission will probably be the chief whipping boy in the fight as far as the White House is concerned. Its practices and policies of regulating the gas industry—or of not regulating it, as some critics charge—are scheduled to become the "horrible example," if present White House plans hold.

Behind the White House plans is a determined drive to snatch control of these so-called independent agencies from Congress and put them directly under the hands of the Executive Branch — although this is being denied for the time being and will be attempted as indirectly as possible.

This is where the real White House-Congress fight will start.

These agencies were created as arms of Congress — permanent committees, almost—to discourage some of the complicated regulatory functions of the lawmakers under the Constitution. Speaker Sam Rayburn, powerful leader of the House majority and mentor of Vice President Lyndon Johnson, was the chief architect in their creation. They are his special pet. Rayburn and Johnson have salved their convention wounds for the time being for political expediency, but have not given up plans for another battle eight years from now.

The gas industry has been a special friend of many Southern and Western congressmen — some because of honest belief in the industry and its goals, others because it is a major economic force and constituency. They'll rush to support the industry and the FPC. Chief among these is Rep. Oren Harris, chairman of the House Commerce Committee and a strong supporter of the industry. Most legislation dealing with these agencies has been handled by this committee.

But knowing his sympathy for the industry, the Kennedy Administration is laying plans to sidetrack Rep. Harris in the type of slick political maneuver which has marked his career and brought him to the country's highest office.

The infighting around the congressional cloakrooms between Administration supporters and backers of traditional congressional separation was bitter as the session got underway.

A source in the new Administration blueprinted the plan for *GAS* Magazine just as Congress was convening. Instead of attempting to reorganize the agency through direct legislation, the White House plans to seek a simple extension of the so-called Reorganization Act. This would go to the Government Operations Committee. Once this is passed, the President would be able to simply send Congress his reorganization orders, and if not actually blocked by a vote within 60 days, they would become law.

With large blocs in Congress under strict White House control, chances are good that on controversies such as completely changing the character of these agencies, votes could easily be delayed, and in effect give the White House near-firm control over the agencies.

"We could kill a lot of birds with this stone if we can get it," one top Democrat said privately.

The simple Reorganization Act purports to be nothing more than a measure granting the President power to streamline those government functions that seem unwieldy or uneconomic without having to combat congressional patronage and red tape. But the Kennedy camp sees it as a means to a major governmental coup.

Some of the conflict between the White House and congressional leaders was evident in two reports issued within a week. One was

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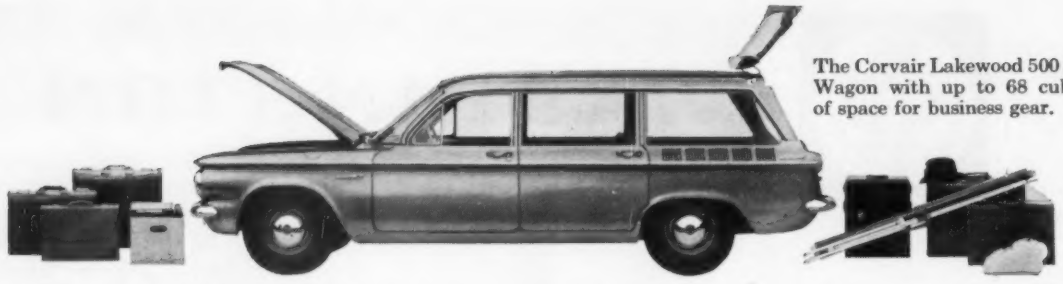

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Cathodic protection of pipe in casing

By MARSHALL E. PARKER
Consulting Engineer, Houston

ONLY a very small proportion of the average pipeline lies within casing at highway or railway crossings. The art of cathodic protection, like most types of corrosion control, is devoted to the preservation of the weakest link; hence the protection of this small part of the line is of major importance. How effective is the protection afforded to pipe which lies within casing?

The major factor in determining the answer to this question is whether or not the line pipe is insulated from the casing. If installed with the proper equipment, capable of maintaining electrical isolation between the two, there are still three places at which damaging shorts can occur: at the end, through failure or through improper installation of the seals; within the casing, through misalignment, incorrect spacing of supports, support failure, or the presence of a short-circuiting foreign object; and outside the casing, by accidental short-circuit between test leads.

If any one of these occurs, so that there is a low-resistance metallic path between the casing and the pipe, then the pipe cannot receive cathodic protection. Furthermore, if the outside of the casing is bare, as is usually the case, it will collect so much of the cathodic protection current that a low-potential area will be created, and as much as a mile of pipe will be brought below protection. If, on the other hand, the casing has been coated, then it will only collect about as much current as an equivalent length of pipe. The inevitable damage caused to the coating by the installation of the casing might increase this to several times as much current as the pipe, but it will still be so small compared to that drawn by a bare casing that no low-potential area will be created.

Of course, if the interior of the casing is empty, the pipe does not need and cannot receive cathodic protection in any case. Most casings, however, contain either mud or water, or both, regardless of the efficacy of the end seals. Condensation of moisture drawn in through the vent pipes will ultimately supply enough electrolyte to make cathodic protection necessary—and possible.

When both of these conditions are met—when the casing is electrically insulated from the pipe and when there is an electrolyte in the annulus—then the pipe can receive cathodic protection from a system supplying the pipeline as a whole. The current flows from the soil to the outside surface of the casing, thereby supplying it with protection; it then flows through the inner electrolyte, from the wetted inner surface of the casing to the wetted outer surface of the pipe. This subjects the inner surface of the casing to anodic attack, but the amount is insignificant. In the first place, the inner surface of the casing is bare, while the outer surface of the pipe is coated, so the anodic area is much larger, and hence its current density is much less. In the second place, even a current density sufficient to supply cathodic protection — two milliamperes per square foot—will only remove 0.001 inch of metal per year *if uniformly distributed.*

It was stated above that the exterior of the casing receives cathodic protection. Normally, if the casing is bare, the current density it will receive will be far too low for effective protection. Even if it is coated, the coating will usually be so inferior, due to installation damage, that the protection will be less than adequate. This is true because the amount of current collected is limited by the demands of the better-coated pipe within the casing, and further limited by its smaller area. It will be true, however, that the outside of the casing receives *some* cathodic protection.

What to do in the case of a shorted casing? First, of course, every reasonable effort should be made during construction to avoid shorts. These efforts should include adequate and well-designed seals and supports; careful installation with good inspection; *immediate* testing, before tie-in; repeat testing after tie-in; and immediate re-installation if a short is found. Supports may well be used at one-half the manufacturer's recommended spacing; often these recommendations are based upon the *strength* of the supports rather than upon the geometry of the installation; the combination of a crooked pipe and a crooked casing can then result in contact between supports installed at the recommended spacing.

If, after completion of construction, a casing is found to be shorted, the answer is not so simple. Test leads should be excavated and carefully inspected as a possible location of the short. (Actually, there is little need for a lead from the casing itself, since the vent can always be contacted.) Shorts have been found where the backfill has settled in such a way as to pull the lead wire against the end of the casing. Further excavation should then be made to see if the short is at the end of the casing, where it can be remedied by a careful re-installation of the seal.

Continued on page 104

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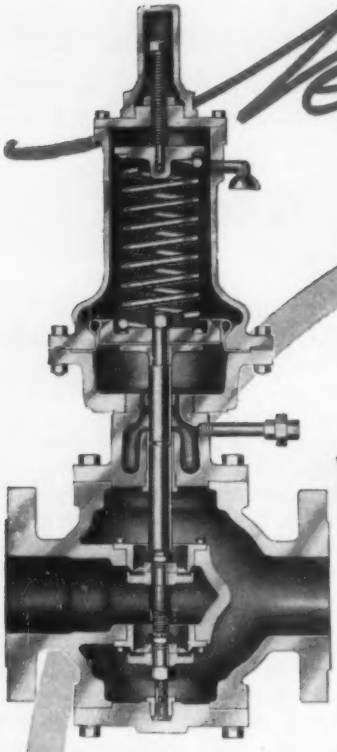

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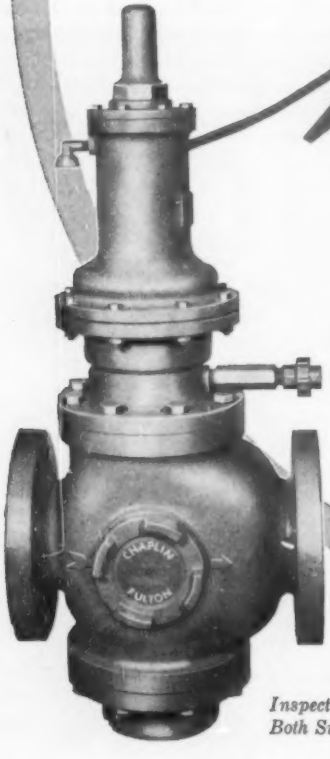

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THE GASSING GAME

By **JIM CLARK** • Gas & Oil Consultant, Houston

THE heart of the gas producing country was not too well impressed with the now famous 29,000-word report by Dean James M. Landis on the subject of regulatory agencies, and especially the Federal Power Commission, the target for Landis' heavy artillery.

The fact of the matter is that Landis was obviously misinformed by some of his sources and he seemed to rely too much on such enemies of gas producers as Sen. Douglas of Illinois.

In suggesting a "czar" for regulatory agencies, of course, Landis was recommending that congressional power be transferred to the executive and that bureaucracy be stacked on top of bureaucracy, but all of this is in addition to the unfair criticism of the FPC, many gas producers believe.

Landis, for instance, reported "the unwillingness of the commission (FPC) to assume its responsibilities under the Natural Gas Act and its attitude, substantially contemptuous, of refusing in substance to obey mandates of the Supreme Court of the U. S. and other courts."

The former New Deal bureaucrat implies here that the FPC has been instructed by the courts to regulate producers on a utility basis. The exact opposite is the case. The Fifth Circuit Court of Appeals in New Orleans has handed down most of the decisions dealing with gas rates allowed producers. This court has gone out of its way to make it clear that the FPC was not obligated to apply the utility rate base or cost of service method to rate regulations applying to producers. So far the Supreme Court has not handed down a decision on a producer rate case, gas attorneys say.

So, what the FPC has really been doing is trying to follow the mandates of the court instead of refusing to obey them. Dean Landis, had he paid less attention to a discharged former member of the FPC who was not reappointed because of his flagrant bias, would have known this. He should have known it anyway since he obviously regards himself as a sort of walking law book.

Producers say another unfounded statement in the Landis report is when he said that the FPC "has exhibited no inclination to use powers that it possesses to get abreast of its docket."

The commission started early to invoke rules and regulations to expedite proceedings. It simply found itself overwhelmed by an unworkable interpretation of a law that was intended by its authors and supporters to do the opposite of regulating producers.

But the commission did allow operators of unitized leases and jointly operated processing plants to file on behalf of nonoperating interests and thereby eliminate the necessity of thousands of additional filings. The commission has done everything in its power, it would seem, to find ways to expedite proceedings within the framework of the law and even its producer critics say it is grossly unfair of Dean Landis to state otherwise.

In his report, Landis picked up the old Paul Douglas "divide and conquer" theme by suggesting that the commission should have exempted small producers who produce less than two billion cu ft of gas a year. He quoted the Douglas figure of 4191 as the number of producers that this would eliminate.

The fact that Landis must know is that the commission has absolutely no statutory authority to exempt any producer from regulation, a gas attorney has pointed out. Only by an amendment to the Natural Gas Act could the commission get authority for such exemptions.

There is one part of the Landis report where producers find themselves on the side of the Dean. That is where he says "amendments to the Natural Gas Act are essential." But certainly this point of view is nothing new. For six years the members of the FPC have beaten a path from their offices to Congress to recommend changes in the act. Gas producers, and lately even some transmission line operators and distributors, have done the same. Producers say that if Landis is sincere he might be effective in breaking the log jam of paper work by supporting a sensible and workable amendment applicable to the regulation of producers. At least two have been offered, both have been passed by Congress, and both have been vetoed by one president or another.

There is one other point in the Landis report where most producers and their attorneys believe the Dean went a bit overboard with the facts. He said the FPC's area pricing policy, "Whether ultimately legal or not, has come far too late to protect the consumer. The area prices there set forth substantially reject the rate base approach, and

Continued on page 110

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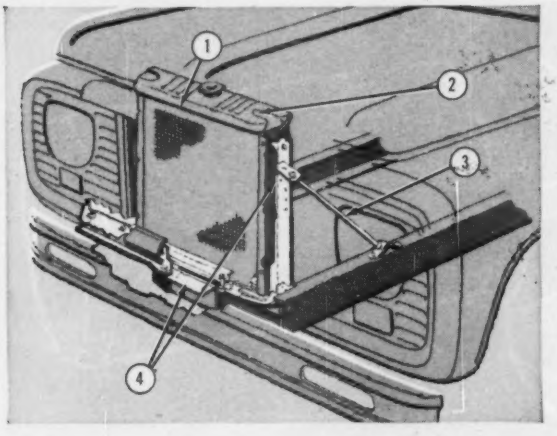

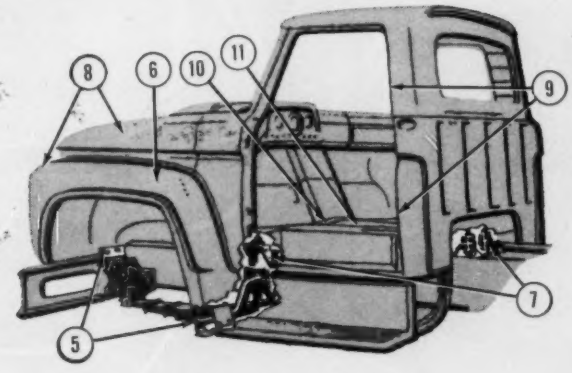

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(11) **Save with new transmission access panel** to cut transmission service time.

FORD TRUCKS COST LESS

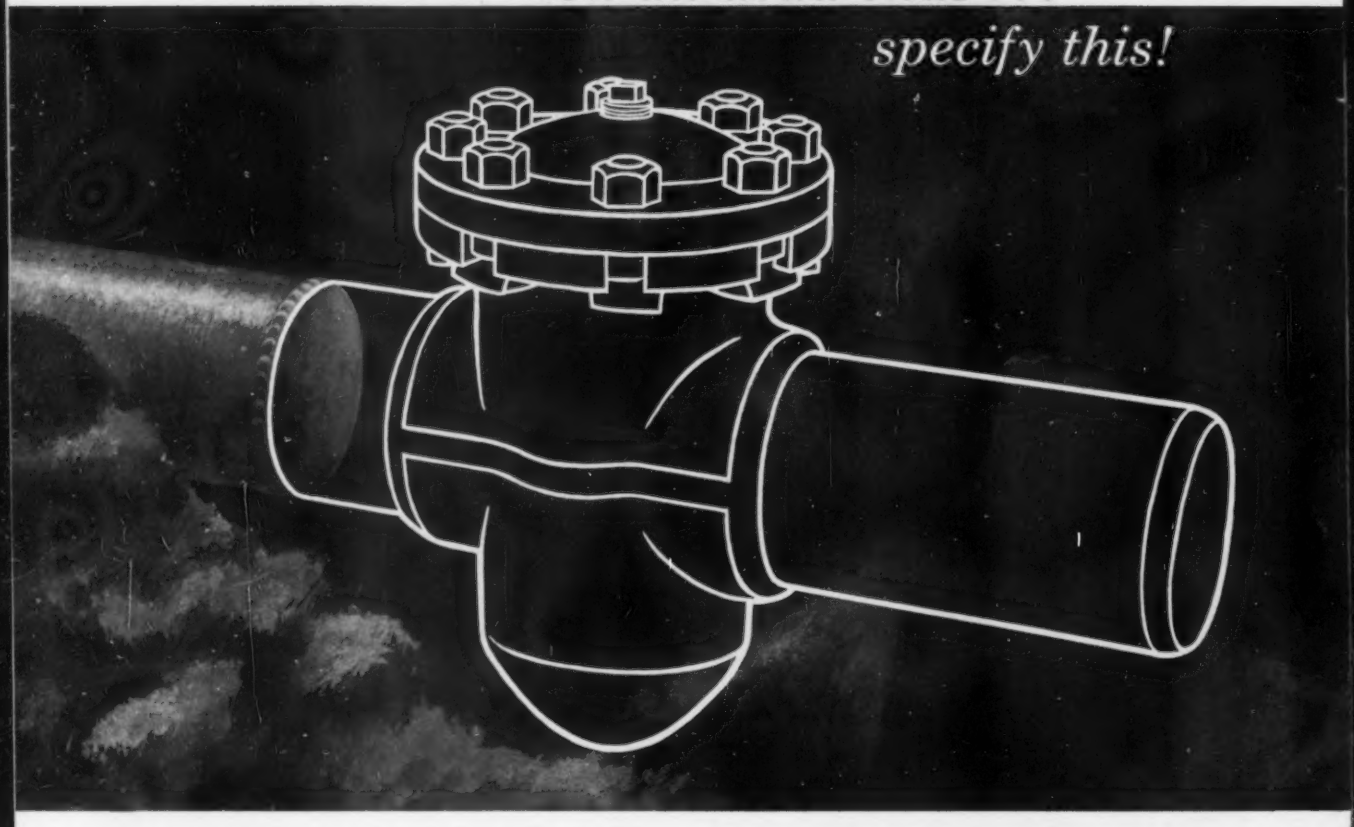
YOUR FORD DEALER'S "CERTIFIED ECONOMY BOOK" PROVES IT FOR SURE...

FORD DIVISION, Ford Motor Company

DESIGN FOR FUTURE MAIN EXTENSIONS

on all dead ends . . .

specify this!



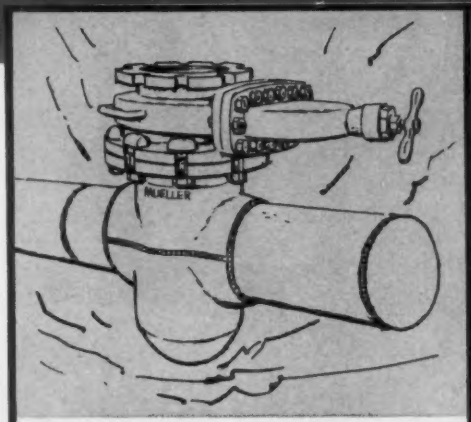
MUELLER EXTENSION STOPPER FITTINGS

Eliminate service interruptions when adding to your present mains. Install Mueller Extension Stopper Fittings on all dead ends at the time the main is laid. Extensions can then be added in a matter of minutes. Flow in the existing main is quickly stopped-off at the fitting while the new main is welded into place in complete safety.

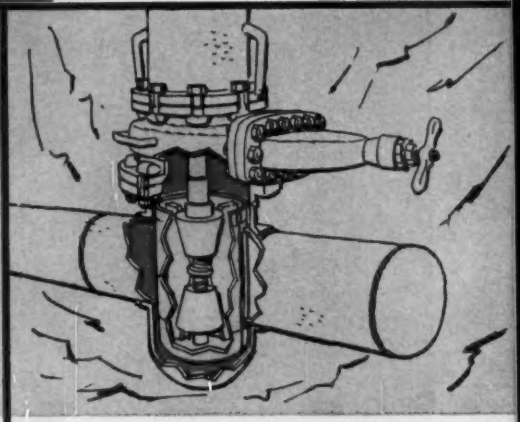
here's how

a **MUELLER NO-BLO METHOD**

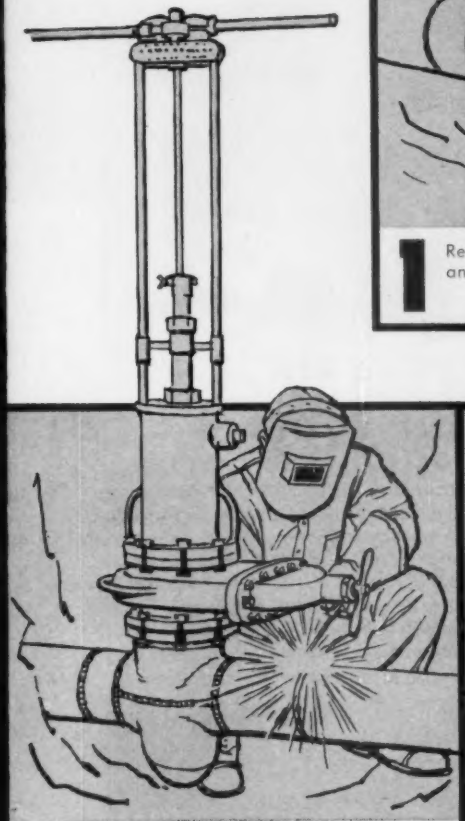
for extending mains under pressure!



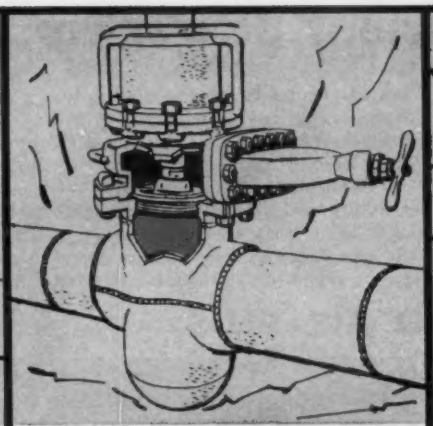
1 Remove cap from Extension Stopper Fitting and bolt gate valve in place.



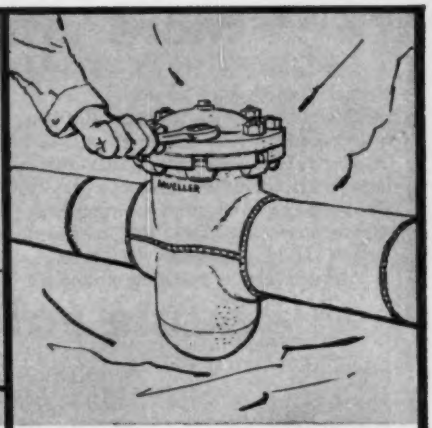
2 Attach line stopping equipment, remove completion plug from top of fitting and insert line stopper. (No drilling required.)



3 Stop-off flow, cut off capped end of fitting and weld new main extension to fitting.



4 Release and remove line stopper and replace completion plug in top of fitting. (New main is now in service.)



5 Remove all line stopping equipment and replace completion cap. (Fitting may be re-used at any time to control flow in new main.)

For complete information and specifications on these and other No-Blo® fittings planned with an eye to the future, write . . .

GEM Sponsor

MUELLER CO. Since 1857 SERVING the Water and Gas Industries QUALITY

MUELLER CO.

DECATUR, ILL.

Factories at: Decatur, Chattanooga, Los Angeles
In Canada: Mueller, Limited, Sarnia, Ontario

UTILITY MODEL 125 CROSS-MOUNTS BEHIND CAB. Overall length 70⅝". Complete with fuel tank. All controls in end of compressor frame for easy operation from the ground. Delivers 125 cfm @ 100 psi at fuel-saving 1750 rpm. Powered with Continental G-193 engine. Full information on request.

More efficient power for air tools

Jaeger rotary compressors for utility installation and maintenance offer two specific advantages:

- **They produce the same air volume as other rotaries at characteristically slower engine speeds, using less horsepower, less fuel, less wear on engine and compressor.**
- **Air delivery is constant under all normal demands, due to closer, instant-acting control of engine and compressor. Speed modulation is completely stepless over the entire operating range. Tools operate at full pressure and efficiency at all times.**

Efficient multi-pass oil cooling keeps air temperatures low, automatic by-pass eliminates "dry starts" in cold weather. Fuel tanks hold 8-hour supply. Portable models have extra large tool boxes.

75 to 900 cfm sizes. Send for Catalog JC-0 and name of Jaeger distributor in your city. THE JAEGER MACHINE CO., 661 Dublin Ave., Columbus 16, Ohio.

JAEGER ROTO AIR-PLUS

MODEL 125 PORTABLES ON PIPELINE JOB: One of the country's most widely used compressor models. Full load speed 1750 rpm.

MODEL 365 ON LARGE TRENCH EXCAVATION in rock stratum. Full load speed 1700 rpm (100 rpm less than other makes).

MODEL 75, IDEAL FOR ONE HEAVY BREAKER: All the air you need to hold full pressure. Full load speed 1750 rpm.

This National Supply wellhead is in operation on the LW-4 well in the Leidy gas storage field. Ultimately, the pool will store 105.7 billion cubic feet of gas for use by New York State Natural Gas Corporation, Transcontinental Gas Pipeline Corporation and the Texas Eastern Transmission Corporation. New York Natural will operate the facility.

Facts about new Leidy Storage Pool:

will store 105 billion cubic feet of gas
will operate under 4,000 pounds of pressure
will depend on 93 National Supply Wellheads

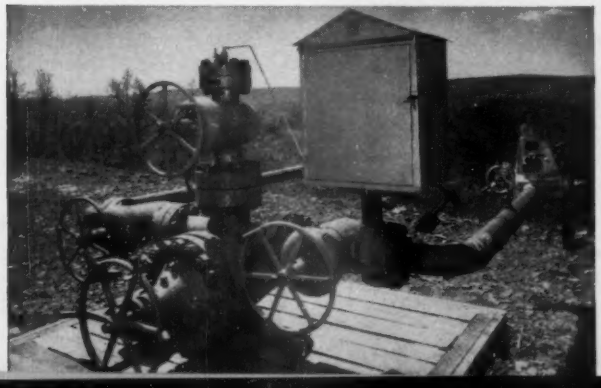
The famous Leidy gas pool is back in the news. A huge gas storage pool is being developed in this north-central Pennsylvania area to serve markets in Pennsylvania, New York and New Jersey.

When completed, the gas pool will be capable of holding 105.7 billion cubic feet of natural gas, including the 45 billion feet of cushion gas.

National Supply has furnished most of the wellheads for this vital new pool, which will be operated at a maximum of 4,000 pounds for storage, the greatest operating pressure of any pool ever developed.

There are many reasons why you usually find National Supply wellhead equipment at important installations such as this Leidy pool.

Pressures up to 4,000 pounds p.s.i. require the heavy duty piping and massive valves of this National Supply wellhead in the Leidy field.



National Supply manufactures a complete line of wellhead assemblies and is fully staffed to service all this equipment in the field. National Supply can design and supply complete wellheads to solve any of your special problems . . . whether they be with tubing hangers, bonnets, valves, flanged and threaded fittings, adjustable chokes and flow beans, flow assemblies, flow controls or specialty items.

For complete information, send in the coupon shown below, or write to National Supply Division, Armco Steel Corporation, Two Gateway Center, Pittsburgh 22, Pennsylvania.

Steel's Symbol of strength, long life, and economy

ARMCO National Supply Division

National Supply Division, Armco Steel Corporation
Two Gateway Center, Pittsburgh 22, Pa.

I would like to know more about your wellhead equipment for gas storage wells.

Name_____

Title_____

Company_____

Street Address_____

City_____ Zone_____ State_____

"WE'RE EQUIPPING ALL OF OUR METERS WITH REEVES-VULCAN SYNTHETIC DIAPHRAGMS"

Nicholas O. Boutzilo, Distribution Engineer
Richard Meyer, Meter Shop Leadman, at right

PEOPLES GAS SYSTEM
Tampa and Miami, Florida

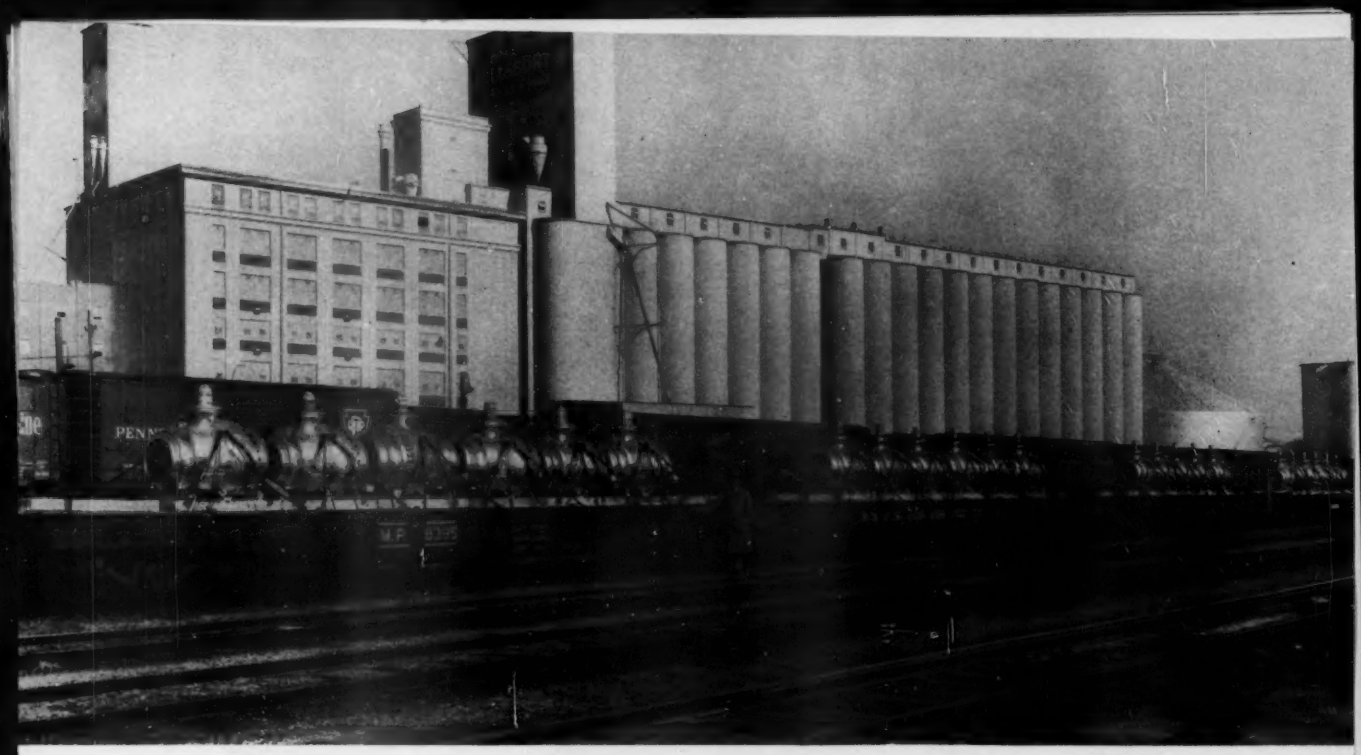
"When we converted to natural gas in 1959, two of our key plans were to improve metering accuracy and reduce meter maintenance costs," says Mr. Boutzilo. "We found we could do this by replacing leather diaphragms with Reeves-Vulcan synthetic diaphragms—in all new and replacement meters.

"During a three year change-out program on over 76,000 meters, we noticed that those still equipped with leather diaphragms had a tendency to run slightly fast. We therefore have discontinued purchase of any leather diaphragms. All meters and regulators are now being equipped with Reeves-Vulcan synthetics, at a rate of about 1000 a month.

"We've found that Reeves-Vulcan synthetic diaphragms last many years longer, and give us consistently accurate metering. They stay clean and never need oiling. They have reduced our meter maintenance costs considerably."

How about *your* metering efficiency? Improve it now with Reeves-Vulcan synthetic diaphragms. There's a model for practically every type of gas meter made. Both molded and crimped styles are available. Order from leading manufacturers or directly from: **REEVES VULCAN**

VULCAN DIVISION, 1071 Avenue of Americas, New York 18, N. Y.



Flat carloads of Rockwell Hypresphere valves ready for shipment to a western gas transmission company.

ACCEPTANCE: BY THE TRAINLOAD

The trainload of Rockwell Hypresphere lubricated spherical plug valves (above) is dramatic evidence of the immediate acceptance of this valve by oil and gas pipeline engineers. Introduced just a little over a year ago (after three years of rugged field testing) the Hypresphere has been specified on most of the big, new pipeline jobs. Why?

The Hypresphere gives pipeline engineers all of the advantages of a lubricated plug valve (positive shut-off, easy operation, faster closure and lubricant economy) with a full round port opening. Also, the Hypresphere is far more compact than non-lubricated valves of equivalent size and pressure rating. Why not get full details plus information on the *complete* line of Rockwell-Nordstrom standard and Hypreseal lubricated plug valves. *Write: Rockwell Manufacturing Company, Pittsburgh 8, Pa. Canadian Valve Licensee: Peacock Brothers Limited; Rockwell International, S.A., Geneva, Switzerland.*

ROCKWELL-Nordstrom VALVES

another fine product by

ROCKWELL

Rockwell Hypresphere ready for underground installation. Note compact size for 30-inch valve.

Save on exploration operations with new 1961 FORD 4x4'S

SAVE WITH AMERICA'S LOWEST-PRICED* 4-WHEEL DRIVE PICKUP WITH BIG 8-FOOT BOX

Pipeline contractors and utility companies everywhere are finding that Ford's good-looking 4 x 4's are real money-savers for off-road operations. The F-100 Flareside model is America's lowest-priced pickup with 8-foot box! And both the F-100 and F-250 (½- and ¾-ton models) are designed to keep right on saving with *lower* operating and maintenance expenses.

You can choose the gas-saving 135-hp Six, or the 160-hp V-8 that gives extra power and smoothness with "six-like" economy! And . . . on all 1961 Ford Trucks, each part, except tires and tubes, is now warranted by your dealer against defects in material and workmanship for 12 months or 12,000 miles, whichever occurs first. The warranty does not apply, of course, to normal maintenance service and to the replacement in normal maintenance of parts such as filters, spark plugs and ignition points. Never before have you had such protection . . . such evidence of long-term economy!

**Based on a comparison of latest available manufacturers' suggested retail delivered prices*

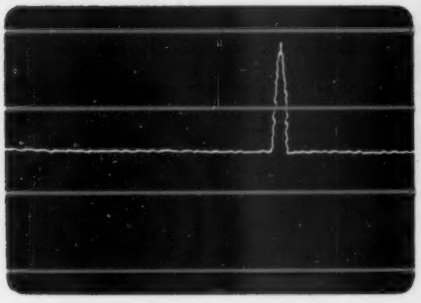
FORD TRUCKS COST LESS

YOUR FORD DEALER'S "CERTIFIED ECONOMY BOOK" PROVES IT FOR SURE...

FORD DIVISION, Ford Motor Company

Acme-Newport Steel

PRECISION STEELMAKING CONTROL PROVIDES QUALITY IN ELECTRIC WELD LINE PIPE



Long-lasting trouble-free quality is the goal toward which this basic steel producer continuously directs every pipe making skill and facility. Acme-Newport's complete control begins in the furnace and continues through every process. Even to final checking of finished pipe by the new electronic eye, which scans the entire surface for any imperfection that may have escaped every other safeguard. All this care in the production of electric weld line pipe makes Acme-Newport your logical source for 4″ and 6″ sizes, standard and thin wall.

SIZES AND WEIGHTS AVAILABLE

O.D.	Wall	Wt. Per Ft.
4½	.125″	5.84
	.142″	6.61
	.156″	7.25
	.188″	8.64
	.219″	10.00
	.237″	10.79
6⅝	.156″	10.78
	.188″	12.89
	.219″	14.97
	.250″	17.02
	.280″	18.97

Acme-Newport Steel COMPANY
NEWPORT, KENTUCKY
A SUBSIDIARY OF ACME STEEL COMPANY

CHOICE OF EVERY MAJOR U.S. GAS DISTRIBUTION COMPANY

DEPENDABLE Assured by unique simplicity of design and construction. Only one moving part, a tough, resilient rubber tube that can never stick or wedge, serves as both diaphragm and valve.

QUIET There is no "slamming". The rubber tube silently rolls on and off the slotted metal body core. Actually, the quietest valve you can use.

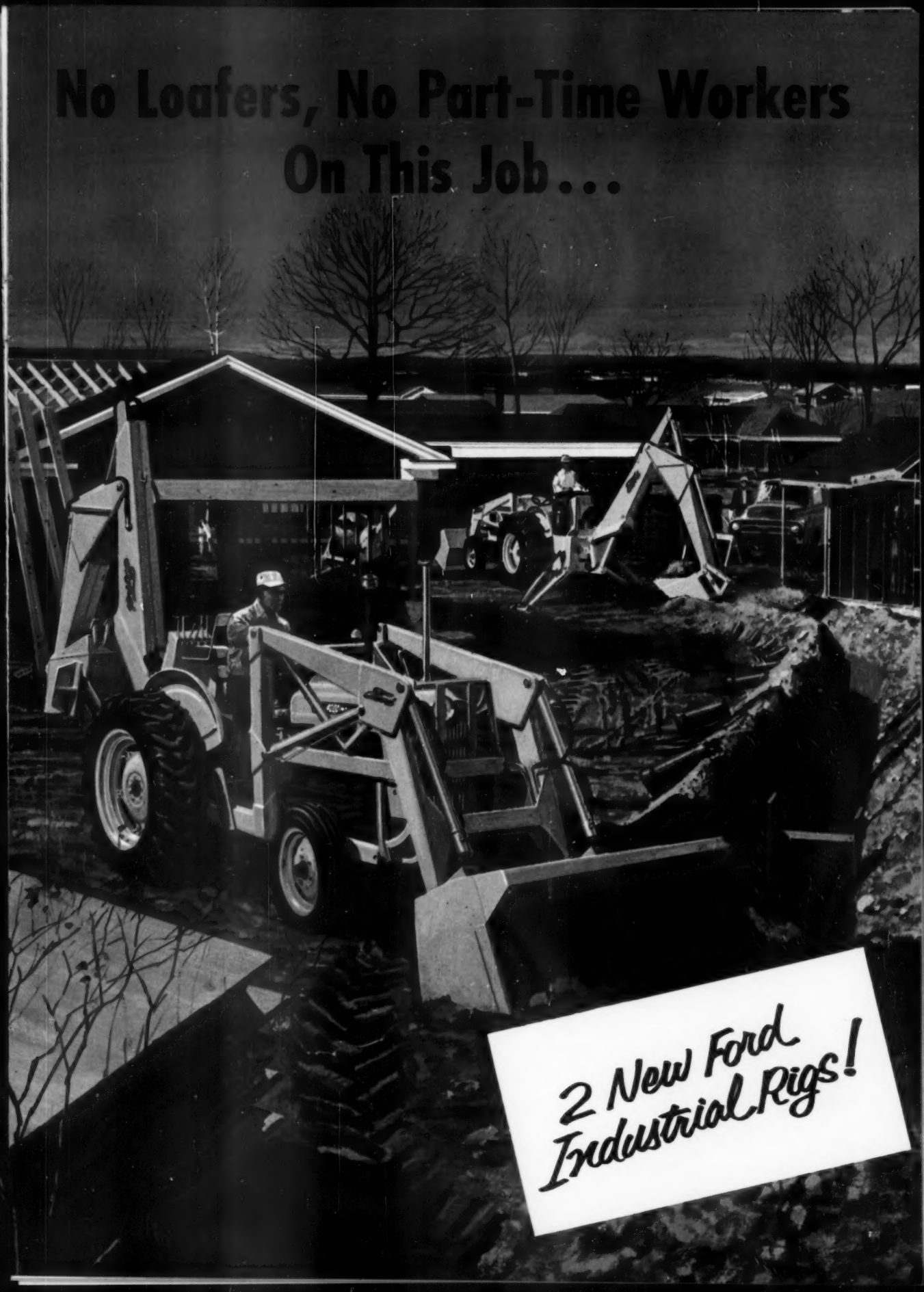
VERSATILE Use for pressure reducing, remote control operations, back pressure control, automatic shut-off and manual open-shut flow control. May be self operated or used with electrical, pneumatic or hydraulic actuated pilots. Can handle gas, water, most petroleum products. Available in sizes 1" to 12", working pressures to 1500 psi.

write for technical data bulletins

GROVE VALVES

GROVE VALVE AND REGULATOR COMPANY
A Subsidiary of Walworth
6529 Hollis Street, Oakland 8, California
Offices in principal cities throughout the U.S.
In Western Canada: Grove Valve Ltd., Edmonton 6323

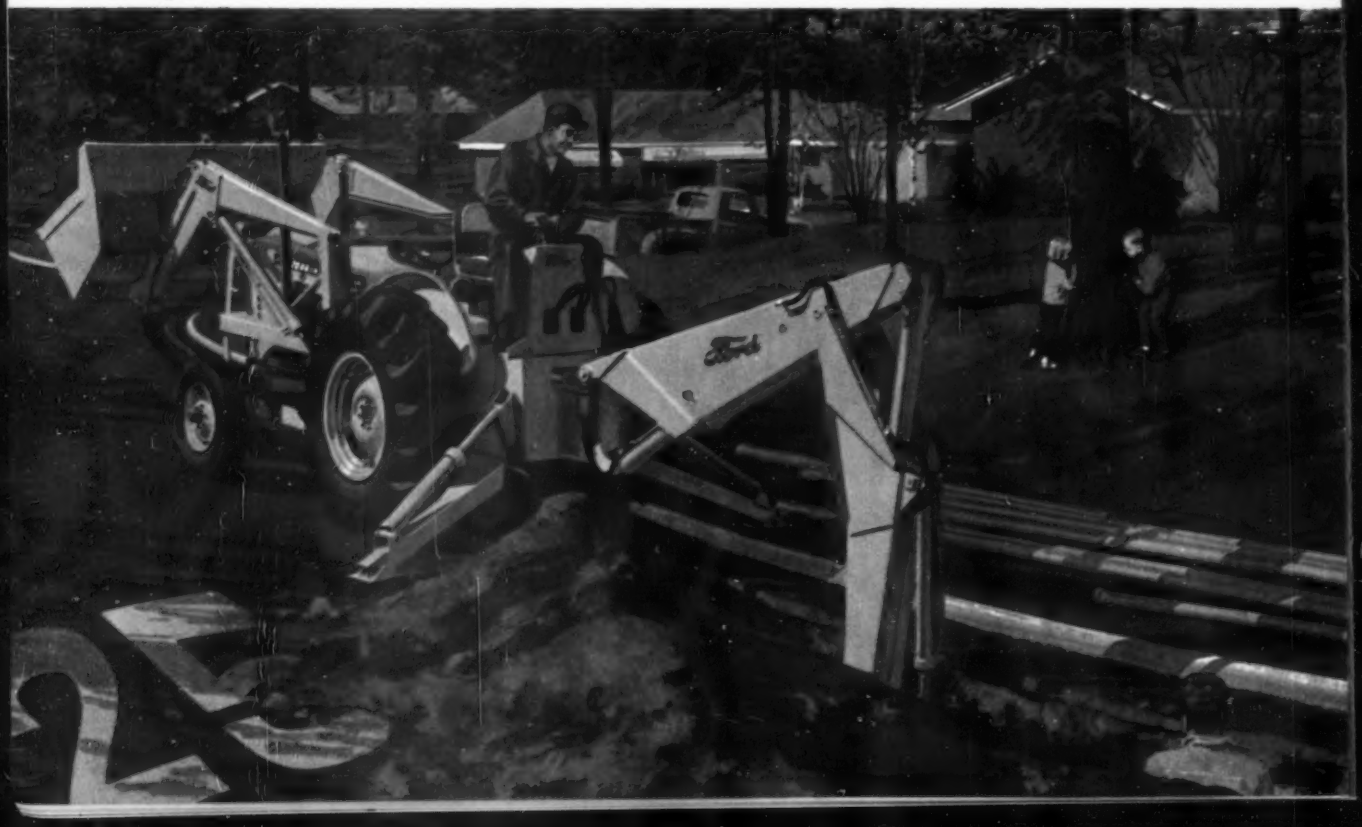
No Loafers, No Part-Time Workers On This Job...



2 New Ford Industrial Rigs!

New FORD 2000 Industrial tractor has 48.4 engine horsepower (gasoline), heavy front end, power steering, foot throttle—easily handles this 10′ Ford backhoe and new Ford 720 Loader. Try this unit for low first cost, low fuel bills, fast maneuvering in tight spots.

New FORD 4000 Industrial tractor has all the high production features of the 2000 but with 62.5 horsepower plus added weight and strength. High powered and rugged, the 4000 makes tough jobs easy with this new Ford 720 Loader and a 12′ backhoe.

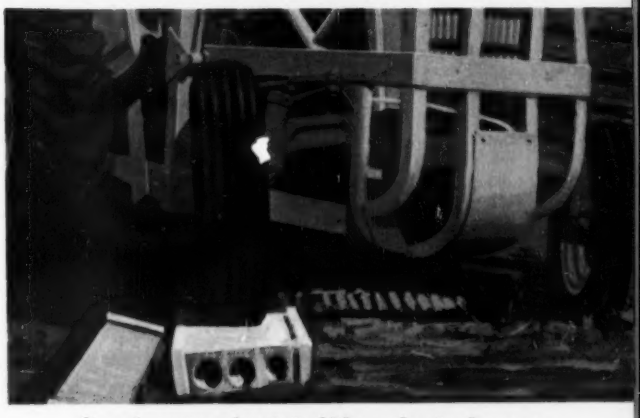


These Bright NEW Ford Rigs are ALL-DAY, ALL-JOB WORKERS

Downshift on-the-go with Select-O-Speed to bull in, bring out a heaped payload . . .

The paint is new but that's not all . . . here are a couple of lean and brawny middleweights with new productivity, versatility, dependability. These new Ford rigs don't sit around on their big fat tires half the day . . . they dig, load, backfill, grade—handle a dozen jobs from either end. A 2000 or 4000 is small enough to get in tight places, strong enough to do the job. They're *sized right* between light and heavy equipment . . . *priced right* down among the lowest of their kind . . . *built right* to do more good jobs for you . . .

NEW High-Lifting Half-Yarder—Half-yard struck capacity bucket, 2000 lb. lift, 4000 lbs. break-out capacity. High-speed, cool-operating hydraulics and Ford's fast tractors permit fast, sustained loading . . . responsive 4-position controls and a handy bucket level indicator provide accurate digging, grading, loading.



One-piece rugged cast steel I-beam front axle moves heavy loads over curbs, across ruts.

Far Reaching Backhoes—Pick the size you need—10′ or 12′ for either unit . . . each Ford backhoe attaches quickly, has big buckets, precise controls, wide stance stability and fast, strong hydraulics . . . the 10′ size digs 10′8″ deep, and reaches out 17′4″ from the axle . . . the 12′ size digs 12′5″ deep and reaches 19′ from the axle . . . Ford backhoes are unmatched for length of trench dug from one setting!

High lift—long reach of loader dumps into the center of your standard truck.

Ford Pays Half your diesel fuel bills—buy a diesel-engined Ford 2000 or 4000 and Ford pays half your fuel bills for the first six months or the first 400 hours—whichever occurs first. Fords are famous as fuel misers and now you can cut operating costs even more. Offer good to March 31, 1961 on any new Ford or Fordson diesel. See your Ford dealer for details.

FOR 101 INDUSTRIAL JOBS

FORD

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BUSINESS REPLY MAIL
NO POSTAGE STAMP NECESSARY IF MAILED IN THE UNITED STATES

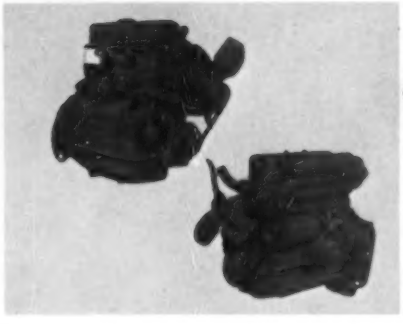
FIRST CLASS PERMIT NO. 119 BIRMINGHAM, MICHIGAN

Ford Motor Company
2500 E. MAPLE ROAD
BIRMINGHAM, MICHIGAN

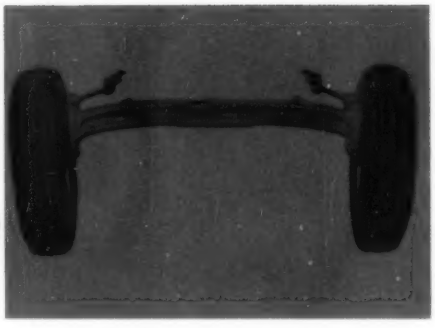
ATTN: Industrial Sales

FORD WORKS FULL-TIME FOR YOU

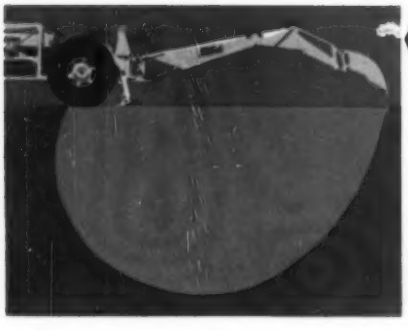
...and here's why:



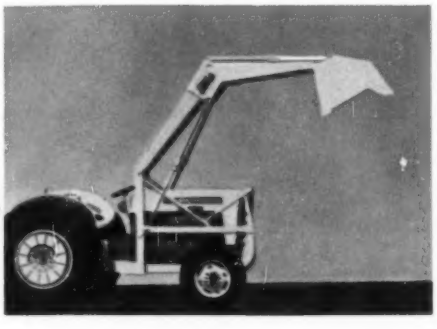
Dependable Power comes from Ford's proven gasoline, diesel or LP-gas "Red Tiger" engines.



Curb Jumper, Rut Rider—5000 lb. rated capacity front axle, larger, rugged spindles, heavy drag links, powerful power steering, big 7.50:16, 6 ply tires—this front end is built to soak up the pounding of heavy work.

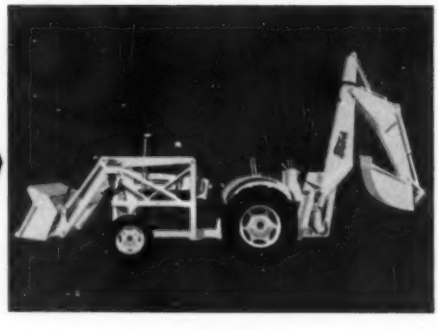


Slashes Labor Costs—Dig by machine, not by hand! All Ford backhoes undercut as far back as the tractor's rear axle to reduce hand digging; all have accurate controls for precision digging around existing lines, other obstacles.



Fast Truck Loader—12 second cycle, bucket position indicator, 45° dump angle, 14° roll-back, long reach, high dump heights, short over-all length—fast truck loading is this unit's specialty.

All Day Comfort—One step up swings you onto the cushioned seat . . . power steering kills ground shocks, handy foot accelerator speeds production.



Tailored to Your Jobs—Pick your transmission: 4 speed, reversing, 12 speed—over under, or Select-O-Speed . . . pick your fuel . . . pick your tires . . . choose from 7 loader buckets, 6 backhoe buckets, 5 stabilizer types . . . and choose from a long list of extra equipment for special jobs. These new Ford rigs *can* be your *all-day, all-job workers.*

Send me information on:

- ☐ Ford 2000 Industrial tractor
- ☐ Ford 4000 Industrial tractor
- ☐ Ford 720 Loader
- ☐ Ford 10′, 12′ backhoes
- ☐ Send name of nearest dealer

NAME_____

COMPANY_____

POSITION_____

STREET_____

CITY_____ STATE_____

Looking for something even brawnier? Check Ford's big 4040 Industrial Tractor

SEE YOUR NEARBY

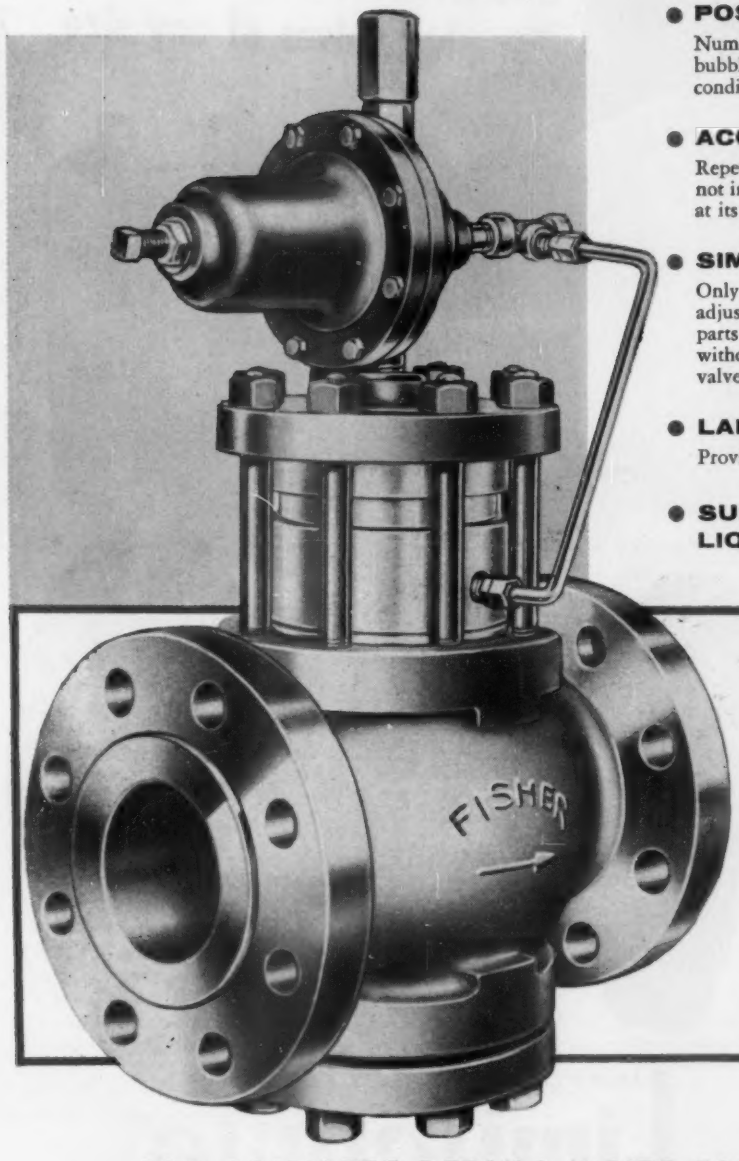
FORD

TRACTOR AND EQUIPMENT DEALER

For trouble-free service on high pressure lines

NEW FISHER 404

high pressure relief valve



- **POSITIVE SHUT-OFF**
  Numerous field tests show that the 404 gives bubble tight shut-off under all pressure drop conditions.
- **ACCURATE AND DEPENDABLE**
  Repetitive operation, frequent or infrequent, does not interfere with its ability to relieve consistently at its predetermined setting.
- **SIMPLE AND COMPACT**
  Only one moving component in main valve. Only adjustment is pilot spring setting. All internal parts can be removed or inspected in minutes without special tools and without removing the valve body from the line.
- **LARGE CAPACITY**
  Provided by full port body and pilot operation.
- **SUITABLE FOR GAS OR LIQUID RELIEF SERVICE**

SPECIFICATIONS

Body Sizes—2″ Screwed; 2″, 3″, 4″, and 6″ Flanged.

Body Material—Cast Steel.

Valve Disc Material—Composition.

Body Trim—316 Stainless Steel.

Relief Pressure Ranges—30 to 600 psi.

FOR COMPLETE DETAILS WRITE FOR BULLETIN P-404

IF IT FLOWS THROUGH PIPE ANYWHERE IN THE WORLD . . . CHANCES ARE IT'S CONTROLLED BY . . .

FISHER GOVERNOR COMPANY

Marshalltown, Iowa / Woodstock, Ontario / Rochester, England

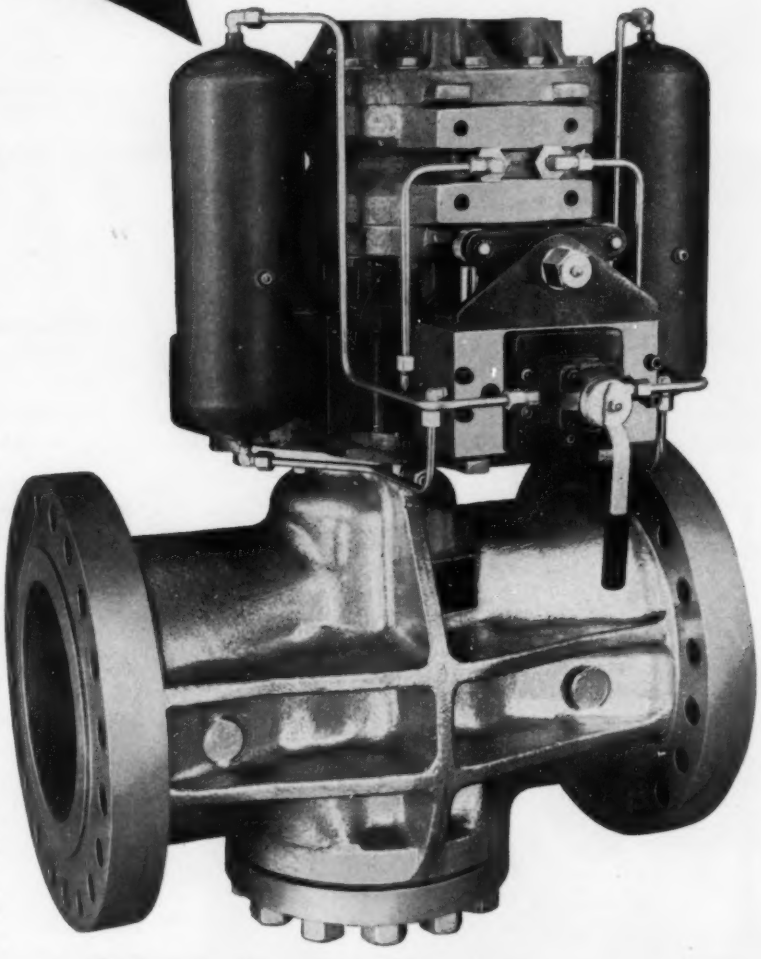
BUTTERFLY VALVE DIVISION: CONTINENTAL EQUIP. CO., CORAOPOLIS, PA.

FISHER® Controls

SINCE 1880

LimiTorque INTRODUCES.....the new type "G" series GAS-HYDRAULIC OPERATORS for plug valves of any size

SIMPLE • RELIABLE • ECONOMICAL • FAST • SMOOTH OPERATION • DELIVERS TORQUE "WITHOUT SHOCK," THROUGH ONLY ONE MOVING PART



These operators have oscillating vane type Hydraulic motors, applying power directly to the plug valve stem—they can be mounted in any position, and are designed to eliminate the usual gearing found on plug valves.

The new LimiTorque type "G" operators are designed primarily for utilization of gas pressure from the pipe line on which they are installed; however, they can be operated by air or liquids from other pressure sources —with or without accumulators.

For pressure operation, the units are equipped with a shear-seal type directional control valve having three positions: Valve open, valve closed, and neutral. For manual operation, the units operate through a specially designed hand pump mounted on the side of the vane motor. The type "G" units can be easily mounted on the plug valve, and because they are directly centered over the shaft . . . It is not necessary to remove the valve from service in order to install the type "G" unit. No maintenance is required with these operators, and it is not necessary to check the level of oil in the accumulation tanks, as this is taken care of automatically.

For complete information, contact your valve manufacturer, or your nearest LimiTorque Sales Engineering Office.

Write for Bulletin 7A-60

THERE IS NO SUBSTITUTE FOR —

LimiTorque®

PHILADELPHIA GEAR CORPORATION

KING OF PRUSSIA (SUBURBAN PHILADELPHIA), PA.

Offices in all Principal Cities

INDUSTRIAL GEARS & SPEED REDUCERS
LIMITORQUE VALVE CONTROLS
FLUID AGITATORS • FLEXIBLE COUPLINGS

Limitorque Corporation • King of Prussia, Penna.

Looking for a LOW-PRICED LOADER with BIG OUTPUT CAPACITY ?

COMPARE these extra-profit advantages of the CASE W-3

One look at this factual comparison tells you the high-speed Case W-3 — with *exclusive* torque converter and direct drive lock-up — is far superior to other economy-priced machines, in the operating features you need most.

This rugged Case-powered *industrial* loader gives you up to *twice* the digging power and tractive ability of lighter-duty machines. Infinite working speeds are adjusted to changing loads *automatically* — without clutching, shifting or stalling. Yet you can switch to direct drive on-the-go, for *18 mph road travel.* With the W-3, you also get *far more lift capacity, plus bigger tires, heavier front axle and up to 90% more breakout* — for handling bigger payloads on faster cycles. Husky tread-width bucket digs deeper, rolls-back farther, levels itself *automatically,* so you can load more yards per day, with minimum spillage.

Get a "Proof"-Demonstration on your job

See a Case W-3 loader in action! Find out for yourself how these extra money-making features can speed your production, cut repair bills. See your Case Industrial Dealer, or write directly to J. I. Case Co., Dept B1391, Racine, Wis., for full information.

ECONOMY-LOADER COMPARISON CHART

Feature	Case W-3	Mfr. A	Mfr. B	Mfr. C
Gross Horsepower	52* (Gas or diesel)	45*	37*	62.5
Max Torque	138.5	125	100	158
Torque Converter	YES	NO	NO	NO
Shuttle Transmission	STD	(Optional)	(Optional)	(Optional)
Clutch	Mult Disc. Hydraulic	Standard	Standard	Standard
Power Steering	STD	(Optional)	(Optional)	STD
Tires — Front	7.50x16, 10 ply	6.00x16, 4 ply	6.00x16, 4 ply	7.50x16, 8 ply
Tires — Rear	14.9x24, 6 ply	12x28, 4 ply	12x26, 4 ply	12x28, 4 ply
LOADER				
Bucket Capacity	15 cu ft to 1 yd	11 cu ft to ¾ yd	17 cu ft to 1 yd	17 cu ft to 1 yd
Lift Capacity	2500 lbs	1600 lbs	2000 lbs	2500 lbs
Breakout	6000 lbs	3200 lbs	3600 lbs	5500 lbs
Front Axle Capacity	7000 lbs	N. A.	5000 lbs	7000 lbs
Digging Depth	3½"	3½"	3"	5"
Bucket Rollback	30°	10°	12°	22°
Self-Levelling	YES	NO	NO	NO

*Mfrs rating. Above comparisons based on latest literature available from Mfrs at time of printing.
N. A. — Information not available.

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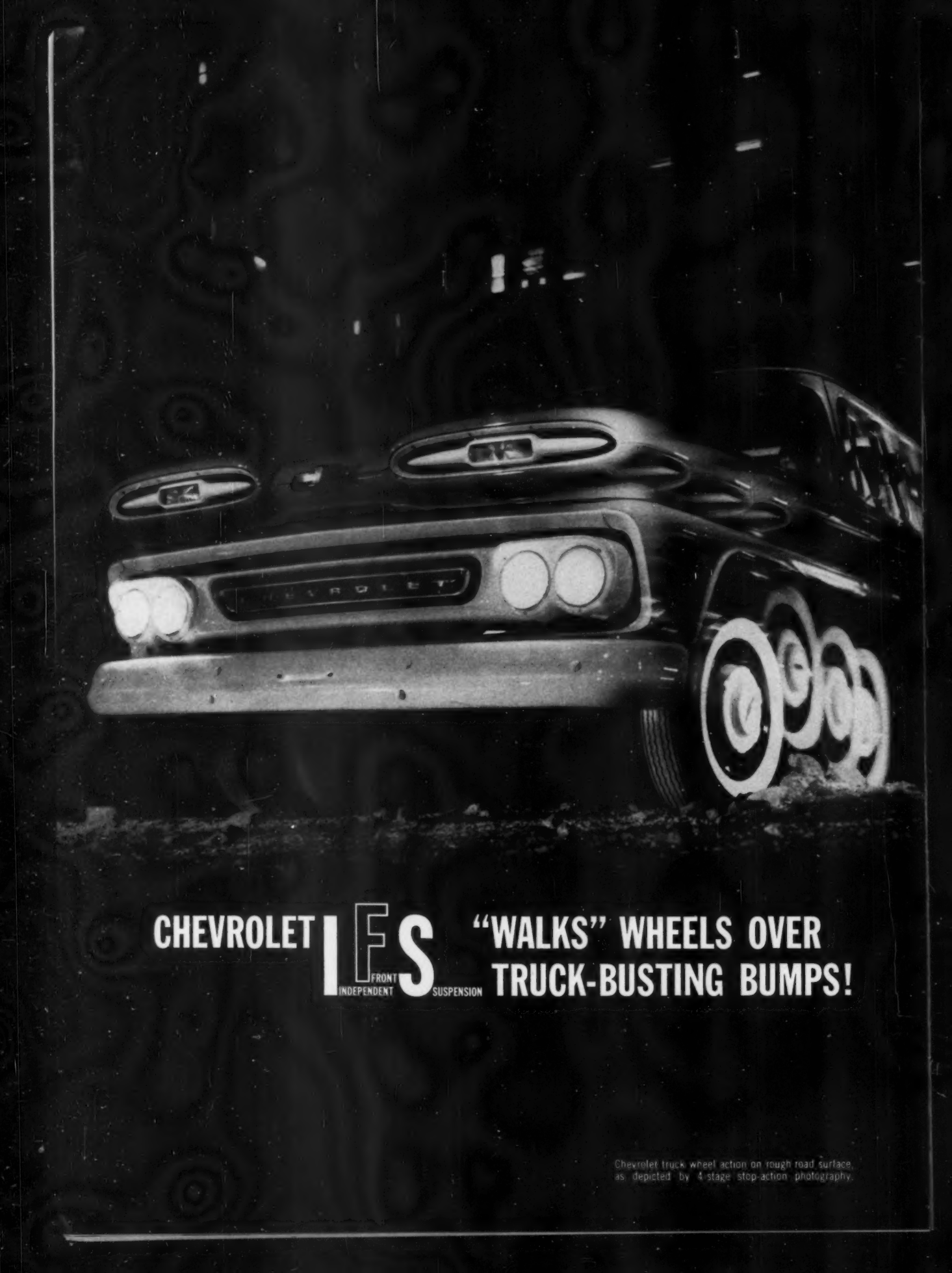
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I F S
FRONT INDEPENDENT SUSPENSION
"WALKS" WHEELS OVER
TRUCK-BUSTING BUMPS!
Chevrolet truck wheel action on rough road surface, as depicted by 4-stage stop-action photography.

"WALKING WHEELS" KEEP CHEVY IN COST-SAVING SHAPE!

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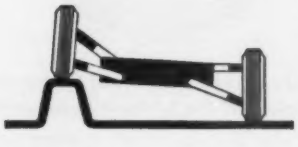
INDEPENDENT FRONT SUSPENSION



In Chevy, each front wheel, suspended independently, is free to step cleanly over bumps (see left). Each works smoothly to reduce objectionable jolts so characteristic with I-beam axle design (right). Working with load-tailored rear suspensions in every weight class, I.F.S. provides the basis for profit-protecting performance that's unmatched by I-beam axle trucks.

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1¼" diameter pipe of Geon rigid vinyl is being installed by Illinois Power Company in gas lines leading to homes at Decatur, Illinois. In addition, ¾" vinyl pipe is being inserted in reamed-out 1¼" iron pipe under streets to avoid breaking the pavement to repair leaking gas lines. Kraloy Plastic Pipe Company, Los Angeles, California, makes the pipe. B.F.Goodrich Chemical Company supplies the Geon rigid vinyl.

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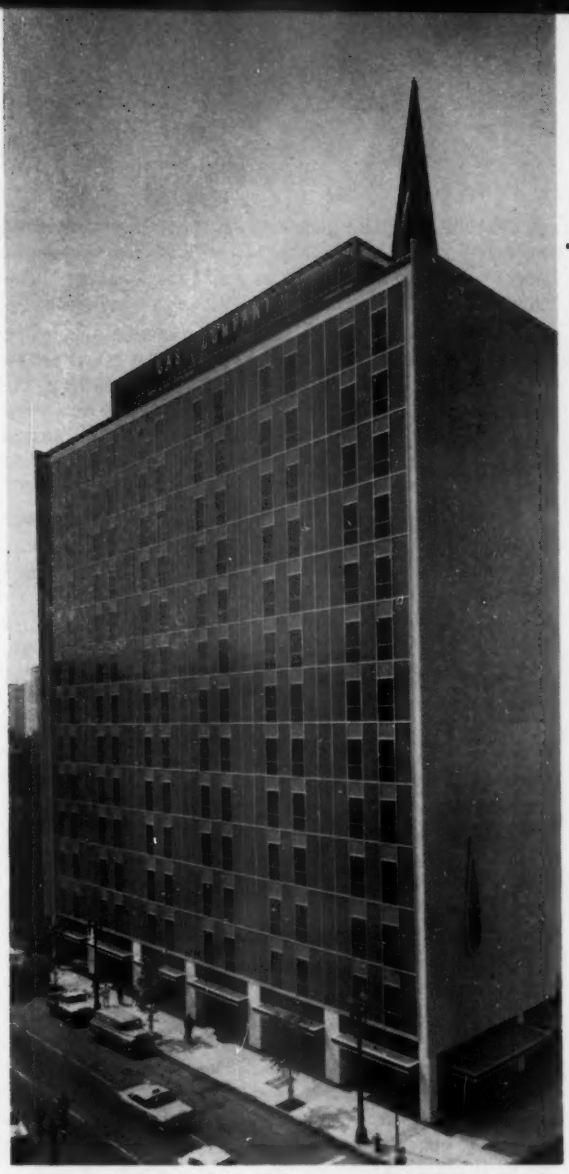

Southern Counties new general office in downtown Los Angeles.

how Southern Counties now HOUSES itself

IN the fast growing gas industry, Southern Counties Gas Co. of Los Angeles has been one of the very fastest growing companies.

A member of the Pacific Lighting Corp. combine, Southern Counties is franchised to serve four of southern California's coastal counties and portions of two others, San Bernardino county and Los Angeles county, which are shared with its sister utility, Southern California Gas Co. Southern Counties' eight operating divisions have had to grow furiously to keep up with the fantastic pace of this booming area.

The company's customers have tripled since 1940 and annual gas sendout multiplied more than sevenfold during the same period. And that rate of growth is accelerating. Look at the way the number of meters has grown: from 218,000 in 1940 to 243,000 in 1945, to 360,000 in 1950, to 549,000 in 1955, to 762,000 in 1960. And in those 20 years, annual sendout skyrocketed from 26,000 MMcf to a whopping 186,000 MMcf.

Supplying that giant appetite for gas is quite a problem, but perhaps an even more difficult one is housing the people who supply that gas. Southern Counties has some 56 "houses," including two general headquarters buildings, located a half-hour's freeway ride apart in Los Angeles.

In 1953, the company's housing problems fell into the lap of Jay Davis Jr. Davis brought a new approach, one based upon file-folders full of highly refined knowledge called "functional specifications." That approach, in one sense a philosophy on sheltering one's fellow workers, reached full maturity in 1960 when Southern Counties personnel settled down into two of the best designed, most quietly spectacular buildings in the industry: its new general office in downtown Los Angeles, and its Orange County Division headquarters in Anaheim.

The word and picture story of functional specifications and how they molded these two structures begins on the next page.

Southern Counties

HOUSES itself

Why the old philosophy was abandoned and how the new one works

- *An adaption of a talk, "The Care and Feeding of Architects," presented by Southern Counties Vice President Jay Davis Jr.*

Jay Davis Jr. became an authority on the care and feeding of architects in the normal course of his duties with Southern Counties. Born in Uvalde, Texas, in 1913, he was educated at Fresno State College and the University of Southern California. His first job with Southern Counties was in 1938 as a utility clerk. After serving as a division engineer, he was promoted to division superintendent. In 1948, Davis moved to the company's general office as assistant to a vice president. He became closely acquainted with the company's building program, and took charge of it in 1953 as manager of construction and distribution. That same year, Southern Counties built its first completely architect-designed base. Davis became vice president in charge of construction and distribution in 1954, and a member of the board of directors in 1955.

ALMOST everything new is developed as an attempt to solve some kind of problem and this was the case with the development of our functional specifications.

At one time, we were among the companies which literally design a building, then hire an engineering firm to prepare the contract drawings. This puts the company in the costly position of paying for the work twice. But, that probably is the least objectionable part of the practice. We had four other important objections.

First, while we were trying to get architects in our outlying operating districts to see things our way, we nearly always gave all building jobs to an engineering firm in the central metropolitan area.

Second, construction costs were out of line despite the fact that our buildings were twice designed. This was generally true on a gross square footage basis as well as on a usable footage basis. People in the building trade typically said no one but the government or a utility could afford to build like this! Most of our buildings were 60 to 65 per cent efficient. This efficiency rating is determined by dividing the gross building area into the area remaining after deducting hallways, restrooms, janitor closets, etc. Some of our buildings cost $26 per sq ft and at 65 per cent efficiency we were getting usable space at $26 divided by 65 per cent—$40 per sq ft. In comparison, our current target is about $14 per sq ft and at least 75 per cent efficiency, netting a cost of less than $19 per sq ft for usable space in a modern air-conditioned building.

Third, and fourth, most of us were not exactly proud of the appearance of our older buildings and several of us were more than a little concerned as to how they operate. As a general rule, we found that we have offices where no offices are needed. The real trouble with this is what it does to the organization. Having an office where one is not needed can delay process flow, impair communications, and add a supervision level. Also, office size appeared to be getting out of hand. One could guess that a new office was designed with the idea that it had to be bigger than comparable offices in the previous job. Cost is important when office size increases but the impressions we create are more important. We should have good, modern offices and bases to promote our "Go modern —go gas" slogan. On the other hand, one of the ways we can get backlash is to waste money with large private offices. The larger the room, the more gold-plated the public believes we are.

All of this led us to conclude that it would be desirable to find a satisfactory way to: (1) do our work with an architect (and do it only once); (2) get better buildings at less cost; and (3) get ideas from the people interested in the building.

Who is interested in a new building? The size of the group is surprising. Since most buildings are in an operating division, we start with the division man-

ager and his department heads. Then there are the other levels of supervision and the people occupying the desk space in the office. The division superintendent may be called upon to supply maintenance services and would like to know what is being installed. You can build quite a list within the division and then there is the general office. If appliance display is involved, the sales department certainly is interested. If material is stored, the purchases and stores department is interested. The list can go on, for about 200 people are properly concerned with almost any building job that comes along.

The problem, then, is how we can discharge our responsibility for design and keep costs in line—when 200 people are eager to contribute ideas. If we were to pass copies of plans to everyone interested in the job, the results could be frightening. Some system had to be devised so the people concerned could express their ideas.

Why will almost anyone drop his work to design a building? Almost every employee wants to be proud of the plant he occupies. This is good, and should be encouraged, but consider his thought process: "It is my office. I know what I want, so I am the best qualified person to design the office. Give me a piece of drafting paper and I will do the job." Most of us will admit that Bernstein is a better musician than we are, that Wood is a better painter, but the poor architect suffers because all of us *know* we are more proficient than he is—even though he has technical training in the field and we do not. Experience is the best way for us to learn that we do not know the architect's field, but there isn't time or money for this.

We have to get this across to ourselves first and then to our employees.

What part can we play in developing the building? We can be experts in saying what we want the building to do. Any office or base is a tool to get work done. It is a very important tool, a multi-purpose tool. We should know the kind of impression we want to create on employees and customers, the kind of work to be performed, the flow of work, and the approximate size and cost of the facilities.

The key is to ask "What do you want the building to do for us?" rather than "What do you want?" With the first question, people are likely to give objectives or standards for the tool. With the second, we are likely to find the unwanted design sketches flowing in from every direction.

Functional specifications were developed by Southern Counties' construction and distribution department. Two men were primarily responsible, W. C. Mosteller, manager of technical services, and J. C. Converse, supervisor of building design. I am proud of their work because it took quite a bit of inventiveness and imagination to develop this useful tool. For some reason people can tell you what they do not like about a building much easier than they can describe what they would like. However, these two men did get the first functional specs together and they continue to improve them as we go from job to job. This saves time for the general office people while still cutting them in at the planning stage. The general office has had nothing but praise for the functional specs approach and no problems have developed.

We have had enough experience to indicate a line of procedure which the operating divisions use to cut their people in on the planning. Several schemes have been tried.

A simple and easy way is to route copies of the functional specs to the people concerned. There is no assurance that design sketches will not come pouring in, but it helps if you impress upon them the question: "What do you want the office to do?"

We start each building job with a functional specifications package to define what we want the job to do. The first draft is reproduced, as many copies as are required. A copy is sent to each company officer and several go to the division concerned. The replies on the first draft are correlated and an amended version is prepared. Where divergent views are expressed, we get the people together. It is the construction and distribution department's job to complete the planning to the point where the work can be picked up by the selected architect. Our goal is to set down all of our objectives and then to back out of the picture and let the architect take over.

We have found that the functional specifications package gives us a new means of selecting architects. In the case of a building for a division, the construction and distribution department asks the division manager for a list of architects he thinks should be considered. This list is checked with our sales department and any other sources available. Usually we do not have many jobs in an area, so we do business with only one architect at a time, although we do promotional work with all architects in the area. We have found that architects respond very favorably to functional specifications.

Originally, we thought we would have the division manager handle the interview but there are some pitfalls with that arrangement. Basically, the architect worries about behind-the-scenes by-play. He knows, or can find out by asking a few questions, that the division people are not the only ones concerned. He wants to deal with the president, if possible, or at least someone from headquarters. The most satisfactory plan we have found is for Mosteller, Superintendent of Operations M. M. Temple, or myself to meet with the division manager and the architect for the pre-employment interview, as well as the job reviews detailed later. This can be, and usually is, a time-consuming item but one which cannot be passed on to division department heads. The division sales manager, for example, should be able to say to both the successful and the unsuccessful candidate that he was rooting for him.

We prefer a flat fee contract with architects. They prefer their standard percentage of the cost of the job, usually 6 to 8 per cent of the low bid. There are

a number of reasons why we do not care for the percentage fee. For one thing, it does not provide an incentive for the job to come in under the budget. Architects say that no incentive is needed. We will not argue the point, but we do not want to be in the position of having the architect's fee reduced because the job came in under the budget or because we reduced the cost of the project by other means. It is easy to understand why architects suffer from fee shoppers. Almost everyone approaches a job knowing that he will have to watch costs but wanting as large a building as possible. This champagne appetite and beer pocketbook convinces most clients that the first place to cut costs in the architect's fee. We believe that the architect's fee is the last place to cut costs. We want the best design job possible for a very important tool. We do not believe the architect is likely to give us his best work if he is worrying about how he can come out on his fee while he is trying to solve the design problem. So, the architect's best efforts are likely to produce the lowest costs and best tool for us.

While we prefer a flat fee basis and so inform the architect at the first interview, we must be careful to indicate that we do not want to talk about the fee until we have selected the architect for the job. We have actually refused contracts because we thought the fee was too low for the kind of design job we wanted. We may have some routines that save the architect money at the draftsman's level, but we want more of the principal's time than the ordinary client would get. Incidentally, we have never had an architect quote a fee we thought was too high. If we cannot get together on a flat fee, or if the particular job does not lend itself to a flat fee, we usually make the contract on an hourly or per diem rate. The important thing is that there can be no discussion of fee until we have selected the architect.

We interview the architect to get his reactions to the job. We ask for a written reply to the functional specifications package and the interview to find out whether he can do the job at the time and whether he understands what we are trying to say. All architects interviewed will be technically qualified for the job. We can find out something about the work the firm has done and its size from the interview, the reply letter, and Dun and Bradstreet reports. The final selection has to be on a subjective basis. We believe it is possible for an architect to do a superior job for one client and only so-so for another. The relationship is a personal one and we must get some measure of whether he understands what we are saying and whether we understand what he is telling us. The better the rapport, the better the use of everyone's time.

When the architect is working on the job, we could consider that our work is completed, but this is not the case. The architect wants to visit our existing plant and meet the people who will use the tool he is going to design. He wants to test the functional specifications package, and we think he should. Good design is not stereotyped and does not occur in a vacuum. Good design is a function of association, of getting a feeling of the organization. The architect usually tries for this by talking to the people who will live with the job. Here is where all hell can, and usually does, break loose—unless you have conditioned your people. An architect usually sketches as one means of communication in trying to find out what we want the building to do. As soon as the people see a sketch, out comes the old urge to design and they are likely to take over. The architect is pained by the takeover because this obviously is not what he wanted. The company's time will be conserved—as well as the architect's—if steps are taken to avoid this. Many more hours can be spent trying to get the show back on the track than would have been involved in the preconditioning.

Part of the problem may be that the people worry about whether the architect really understands their needs. They can be relieved of this worry if they are told they will have three chances to see the work before construction begins. First, they should see the functional specs and have full answers if something they want is not included. They should also know when their suggestions have been included. Second, they should see preliminary drawings shortly after the architect is hired. This assumes that the amateurs do not take over. If they do, preliminary plans may have to be reworked several times before they are ready. We circulate preliminaries among the general office people and consolidate the comments. We expect the division manager to do the same within his division and then we meet with him to shape the final comments. Then, at least one of the Mostteller-Temple-Davis group meets with the division manager and the architect to approve the preliminaries. Third, the preliminary drawings are developed into construction drawings and the people concerned get their last chance to see the job as planned. We will circulate these plans among the general office people as before and meet with the division manager for any final changes.

To summarize, we switched from working with engineers to working with architects—via the functional specifications package—because architects ask the most important questions: What are the relationships? What effect do you want to create? What do you want this tool to do for you?

Once these questions are answered, they have an architectural framework for the total site, including all of the buildings and grounds. They then secure the engineering services needed to work out the construction drawings within the architectural planning. We believe this concern with the effects on employees, customers, and work flow is the first order of business towards securing the kind of tool we need. This developmental process is the natural order of work for the architect. Hence, we retain architects instead of engineers. Our experience indicates that we get better bases—and at less cost.

If we can become sophisticated users of architectural talent, the results will be better and more pleasant tools for our businesses. The prime rules are: to spend plenty of time developing functional specifications, to leave the design job to the architect, and, above all, to be experts only in what we want the tool to do for us.

Southern Counties

HOUSES itself

The table of contents of the functional specifications for the new general office building, the checked sections being those which are quoted in their entirety on this and the following pages.

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3. Company organization charts - General Office
4. Company department office space tabulation
5. Plan of property location
6. Pacific Lighting Corp. and Pacific Lighting Gas Supply Co. organization charts
7. Pacific Lighting Corp. and Pacific Lighting Gas Supply Co. office space tabulation.

How functional specifications molded the new general office building

Selected portions of "Functional Specifications for Southern Counties Gas Company's Flower Street Office Building" . . . along with comments by Jay Davis and two of his top building experts, Superintendent of Operation Monte M. Temple, and Supervisor of Building Design John C. Converse.

ON Aug. 3, 1956, Jack Converse sat down to write the functional specifications for a new Southern Counties general office building. The proposed site was a downtown Los Angeles corner lot next to the Southern California Gas Co. buildings which housed Southern Counties top executives and other segments of its management.

After more than a month of solid work, Converse completed the first draft on Sept. 7. Two drafts later, on March 12, 1957, the functional specifications for the new building were complete—a half-inch-thick folder containing the material shown in the table of contents on this page. Between September and March, some 50 copies had gone out to management for five different "levels of comment" and were seen by approximately 400 people.

On March 21, 1960, the first contingent of Southern Counties personnel moved through the freshly plastered "cut-through" from their old offices in the SoCal building to their new quarters in the SoCounties building. The move-in date had been pushed back several months because of three strikes and other assorted delays having nothing to do with the building's design; but other than that, the structure has lived up to expectations.

Southern Counties new downtown Los Angeles home is 13 stories—148 ft-5 in.-high. A 50-ft illuminated, three-dimensional plastic flame on the roof takes it right up to the city's height limit. On a lot that is almost three times as long as it is wide, the building measures 152 ft 4 in. long and 54 ft 6 in. wide. Total floor area is 118,000 sq ft, the area for an average floor being 8,170 ft.

Total construction cost of the project was $2.4 million. Additional costs were: $130,000 for property, $160,000 for architectural fees and $190,000 for signs, landscaping, and interiors.

A detailed description of some of the building's most interesting facets begins with the next paragraph, functional specifications in bold type, comments in italics.

INTRODUCTION

Company executive offices and a portion of its staff management personnel are now occupying rented office space in a building owned by the company's affiliate, Southern California Gas Co., at 810 S. Flower St. The growth of Southern California Gas Co. and its need for additional office space requires that it take over the space now occupied by the company. The company contemplates constructing a 13-story legal-height full basement office building at the southeast corner of Flower and Eighth Sts. Five floors

will be occupied at the outset by the company. The major portion of the top three floors will be leased to the company's affiliate, Pacific Lighting Gas Supply Co., for its executive offices and general office staff. An executive suite on the 13th floor will be leased to the company's parent, Pacific Lighting Corp. The first floor will be leased to Southern California Gas Co. for its use as a customer payment office and for appliance display. A major part of the basement will also be leased to Southern California Gas Co. The remaining four floors will be rented to the public and later made available to meet future requirements for expansion of the company or its affiliates.

The new building will contain provisions for connecting through to the Southern California Gas Co. building on most floors, but will be completely independent in so far as having its own entrance ways, elevators, utility services, etc. The building is to have all-year air conditioning and high-speed passenger-operated elevators. It is to have a loading dock arranged to service the new building and the basement of the Southern California Gas Co. building.

The company has a parking garage and parking lot at 821-825 So. Hope St. It intends to apply these existing parking facilities to meeting code requirements as to parking for the new building. The company has additional property in the 700 block on Flower St., however, which could be made available for parking if necessary. The Hope St. parking lot may be used for construction storage during building erection.

"All we were trying to say here was 'Don't worry about parking ordinances requiring "so much" parking area for "so much" office space.'"

The prime objective of the company in the design of the building is economic—the securing of a quality building adequate to meet the company's needs at minimum cost. The company does not have in mind marginal construction or skimping any desired features. It is the economy and the increased value in appearance and utilization that can be obtained through careful planning and design that the company wishes to achieve.

"The architect's first presentation is always on the expensive side. So he practically expects his first offering to be cut down to somewhere near the size of the announced budget. This paragraph is our first effort to impress him with the fact that we really do want economy without marginal construction or left-out features."

"As it actually worked out, construction costs were very satisfactory. When the four leased floors are completed, we will have a 119,000-sq ft building for a construction outlay of little more than $2.4 million —an average cost of $20.42 sq ft. In comparison, a nearby office building was recently constructed at $34.40 sq ft. Our building has a considerable site penalty factor, estimated at $4 sq ft by our architect and at $2.50 sq ft by us. Included in this penalty factor were: a long, narrow site, ceiling heights limited by those of the adjoining building, and no stack space for building materials. Yet, our architect was able to provide a design which gives us 76 per cent efficiency. On this basis, our usable space cost $25 sq ft while that nearby building's cost $57 sq ft!"

The purpose of this prospectus is to crystallize the company's needs and requirements so they may be orderly obtained. Care has been taken to phrase this material in terms of the end results desired—the functional requirements and company objectives—so that the architect and design engineers, in turn, fully contribute their skills and ingenuity to meet these goals at the lowest cost consistent with long term economy and quality.

Included is an outline of the manner in which the company intends to select the architect and also of the company's general plan for handling the architectural design phase. The company-architect relationship is contrived to place the architect in the best position to produce value to the company in meeting its objectives.

PLAN FOR DEVELOPING DESIGN

As the key to the successful construction of a building within the company's objective lies in the planning and design, it is important to plan the planning.

The company intends to select an architect based upon its appraisal of his professional know-how and his ability to produce the end-results desired. The fee arrangement to be established with the architect will be directed toward maintaining an incentive on the part of the architect to bring about economy to the company. The architect-company working relations are devised to induce the successful performance of each stage of design in an easy and orderly manner. The company will maintain control over end results without the fuss and fanfare of the architect's daily checking design items—with or without the company following a looking-over-the-architect's-shoulder procedure. This functional specifications packet and the preliminary design "look" to be described in a later paragraph should minimize the changes that may be asked by the company upon the architect's completion of construction drawings.

"Until an architect has that rare and pleasant experience of not having a client continually looking over his shoulder, he is certain that the client will do so. Our goal is to try to get him to come up with something he creates to fit our needs, not merely a translation of our dictated plans."

The company intends to discuss this project with architects it feels will be qualified and available and will invite each to submit such information as may be helpful to the company in making its architect selection. This information should include a list of buildings designed by the architect of the type the company intends to construct. Each prospective architect will be given a copy of this manual and be permitted to question any specification which he thinks runs cost over other alternates. The company wants rough estimates from each architect as to the over-all building cost. These cost figures will be one of the factors considered by the company in making

its architect selection and must be adhered to in final construction within conditions and limitations to be specified. The architect's availability for proceeding promptly on this project will be another of the factors considered in his selection, since both the company and Pacific Lighting Gas Supply Co. have commitments as to when existing quarters must be vacated.

"With the wealth of internationally famous architectural talent right here in the Los Angeles area, selecting an architect might seem to be a terribly frustrating task. Yet—by the process of elimination—it was relatively easy. Some were immediately eliminated because they had too much work; others, because they specialized in another type of building. And some just had shops that were too small to handle our job. The field was finally narrowed to eight, and functional specifications were presented to all eight. After an interview with each, we asked for a list of their favorite jobs, ranging from the very austere to the very plush. After viewing their work and talking further to each, we picked Albert C. Martin Jr., AIA, and Assoc."

Each architect should submit a time schedule showing the time required and completion dates of the major phases of the design and architectural work with a firm date by which he could complete all plans and construction drawings. The architect's fee will be negotiated after selection of the architect.

"The word 'negotiate' is actually somewhat misleading. We simply ask the architect to state his fee. We want him to be in a position to worry about the costs of the building and how to make it an effective tool—rather than about whether he will recoup his costs. Architects have had so much experience with fee shoppers that they are generally preconditioned to believe that this is really what we are concerned with. It is often necessary to overemphasize the point that we don't believe in fee shopping. In one case, we actually told the architect that we felt he could not do the job we wanted him to do for the fee he named."

The company, upon selection of the architect, will make such changes and revisions in the functional specifications packet as may arise from its further investigation or from the architect's suggestion.

The services of the architect retained fall into four components:

A. First, the architect will provide preliminary layout drawings, including floor plans and overall building elevations, together with such descriptive statements as may indicate the salient general features he proposes to incorporate in the building. A further refined cost estimate—together with estimates of cost of such alternates as may be presented—is to be included. The amount of parking space required by code and the possible use of property owned by the company to meet code requirements shall be determined.

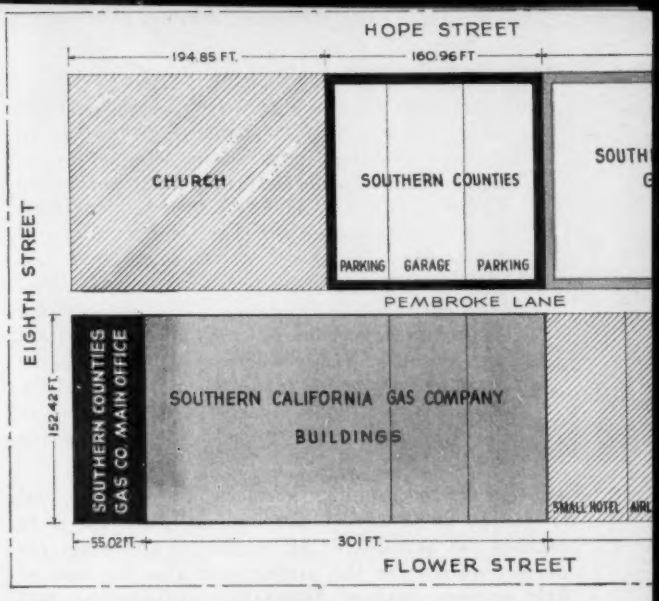
B. Upon the company's review and concurrence on the preliminary plans, the architect will prepare final construction drawings, conditions, specifications, and other items needed to complete the contract documents. Such drawings and specifications are to include interior and exterior color schedules, decorative features, and similar items to permit full completion of the building without direction or advice to the contractor from the company. The architect will also prepare an accurate estimate of cost.

"The term, 'more refined estimate,' should have been used, since—from an engineer's standpoint—there is no such thing as an accurate estimate'."

C. The company will review the final plans and drawings and may direct that certain changes and additions be made. Upon completion of these changes, the architect will provide a final estimated cost.

D. The architect will assist the company in negotiating the contract. The invitation to bidders will be issued by the company. There will be a public opening of the bids and the architect may be present if he desires. The company will determine the qualifications of bidders. The architect is to provide such inspection and testing as required to secure construction in line with plans and specifications. The architect will inform the company of changes or extras he recommends during construction. The company will negotiate changes with the contractor.

"The key is that last sentence. We believe in separating the design from the execution—and this is our opening wedge. Design and execution are two different things, requiring two different types of people. A great architect may not even be fair at overseeing the execution of his work. We believe his part in the construction phase is strictly to make sure that the intent of the design is carried out and that his expertness on the design of the building is recognized and used. The architect's role in construction is spelled out in our contract with the general contractor:



All SoCounties downtown Los Angeles property is shown on this portion of the plan of the gas companies' block.

"'Architect's Status—Architect is responsible to owner for design of the building and the specifications therefor. Architect is agent of owner only when in special instances he is authorized by owner so to act. Architect shall make periodic visits to the building site to see that the intent of the design is being carried out in the execution of the work by contractor, and architect shall have the right at any time to visit the building site for such purpose. Contractor shall cooperate with architect and provide such information as architect requires in connection with such visits. Architect will report his findings in writing to owner following all such visits to the building site.'"

The fee for the architect services in Steps A, B, and D will be at an agreed flat amount. Such fee is to include the services of all engineers and other experts required for the project and also the cost of field surveys, borings, foundation explorations, materials testing, and similar items. The fee shall be broken down between Steps A, B, and D so that the company may terminate the project in any given design phase.

"There is one very important point in this paragraph and one important change. The important point is that we prefer a flat fee rather than the usual percentage of the total cost. Our reasoning is that the percentage fee is contrary to the architect's basic purpose. We hire him to design the best tool that will do the job—but at the lowest cost consistent with our aims. Thus, if he does a good job and really holds the cost down, he cuts his fee, a sort of reverse incentive pay plan. We certainly don't feel he should be penalized for doing a good job. Some architects argue that their costs bear a direct relationship to the cost of the building and therefore their pay should be on a percentage basis. This is certainly true with many types of buildings, but we do not believe it to be true with our type."

"The change is that the architect's fee on this job did not include the services of engineers and other experts for surveys, explorations, etc., and we will not include this in any future contracts. This can be too great a burden on the architect, making him wonder if he will come out ahead. We'd rather pay for these services ourselves. However, the architect can make all arrangements for these services—with our concurrence."

The revisions and additions requested by the company in Step C will be at a fee agreed to at the time of the revision and may, at the company's option, be either on a per-day-cost-plus basis or a fixed-price basis.

"With our present functional specifications system, we expect 1½ to 2 per cent changes, only a small fraction of the usual number for such buildings. The architect expects a certain number of these—due to strikes, materials shortages, and other unforeseen problems—and figures these in his fee. This paragraph covers more major changes, probably caused by us changing our mind. There were no such changes in this building."

If the lowest acceptance bid exceeds the architect's final cost estimate, the architect agrees to do work required to bring the bid into line without additional compensation. The architect is to also agree that the final bid will not exceed his original rough estimate by more than 20 per cent. (This is the estimate considered by the company prior to engaging the architect.) If the bid exceeds this original estimate by more than 20 per cent, the architect's basic fee (for Steps A, B and D) will be reduced by the percentage above 20 per cent. Example: Bid 25 per cent above original estimate, architect's fee reduced by 5 per cent. Conversely, if the bid is more than 20 per cent below the original estimate, the architect's fee will be increased by the percentage the bid is below 20 per cent. The portion of this provision concerning decreasing the architect's fee may be waived at the company's option.

"This entire paragraph has been left out of all subsequent functional specifications for two reasons. The first is that we now feel that they would never believe the intentions behind this paragraph were honorable. But, our intentions were good—to try to hold the architect to realistic price estimates. Typically, an architect's estimates tend to be optimistic. Part of this is due to the way he gets his cost figures. For one thing, architects are usually a year or two behind the labor-and-materials cost spiral. The second reason was that you can't put in a penalty without a reward—and we've never met an architect who would accept a gratuity. You can't even buy an architect a hat for doing an outstanding job. He is a special breed who wants no bonus for a job well done, feeling that the knowledge that he did a good job is sufficient reward."

FUNCTIONAL SPECIFICATIONS

General

With a prime objective of the company being one of economy coupled with adequacy, the building should incorporate the features dictated by occupancy requirements, utility of use, and pleasing appearance, all combined so as to promote the esteem of the public and employees.

The building should conform, with tolerance, to the modern appearances of newly constructed buildings, but at the same time the exterior appearance should not be incongruent with Southern California Gas Co.'s adjacent structures. A design which may be referred to in 10 to 20 years as "dated" or "period-type construction" is not desirable. The company wants a building that is attractive in appearance but obtained in an unobtrusive and modest tone—not one appearing to be freakish or unconventional in design. The building should signify prudence coupled with substantiality. The building should be economical to operate and to modify as future conditions may require. The building should be able to stand the test of time in the sense that it does not appear to be obsolete ahead of its time.

"One of our prime problems was creating a modern building that would be a good medium for displaying modern gas appliances—without being so extreme

as to fight with the facades of the three SoCal buildings adjoining it. The nearest and largest SoCal building won an architectural award when it was built in 1924, so we wanted to preserve its 30-odd-year-old dignity. We think the architect succeeded in doing this by using two devices. First, the end walls, which adjoin the SoCal building, are faced with a stone surface. Actually, this surface is made up of bolt-on, 8-ft-4-in.-by-11-ft, reinforced pre-cast concrete panels coated with a quartz mined in a local desert. The quartz on these 'Mo-Sai' panels is graded for color by an electronic scanner and provides a 40-year surface with a texture not unlike the adjacent buildings. The second device is a deep blue porcelain enamel reveal which separates the two buildings. It's recessed 2 ft and the darker color gives the feel of a much deeper recession."

"Incidentally, the architect's comprehension of this paragraph was most important—for one architect eliminated himself from this job by not getting the meaning. He kept speaking of building a monument and all we could think of were some of the horrible new buildings that are built by 25-year-old design standards."

The company has in mind the problems from extensive window treatment in heating, cooling, sunglare and interior decorating. A semi-windowless design may be considered, provided the exterior appearance is in keeping with current architecture and not freakish.

"As is the case with any sunny, warm climate, glare and heat control are two of the big building problems in southern California. Fortunately, our southern exposure was taken care of by the adjoining SoCal building. And the eastern and western exposures, the short end walls, were taken care of by the Mo-Sai panels just mentioned. That still left the northern exposure, which had a potential glare problem.

"We were tempted to construct a completely windowless building—since the end walls would not have windows—but we backed away from this because of the danger of either producing a startling new trend, or an example of what not to do. The solution was a limited number of inconspicuous floor-to-ceiling windows. The overall effect from the inside is plenty of windows, but the actual penetration is only 25 per cent of one wall.

"Actually the north wall presented quite a problem and for a while was a sad situation. It was finally solved right on the floor of our office. Martin spread the drawings out on the floor, got down on his hands and knees, and drew the fenestration that we now have. Since he has a big office with over 100 people, it was one of the rare times he has had a chance to solve a technical phase of an architectural problem with his own pencil. This is the kind of thing we try to encourage.

"Actually, there were a number of other design problems. A long, narrow building such as this presents a high seismic load factor. This was coupled with a tight floor height—11 ft—to match the adjacent SoCal building. The desired flexibility mentioned in the next paragraph of the functional specs was another design problem. And still another was the logistics problem—materials had to be carefully selected because no stack space was available.

"Martin's design is a simple steel structure with beefed-up columns and floor joists to take care of the seismic load. On the end walls, the Mo-Sai panels were bolted directly to the steel frame. The long north wall had to be built as lightly as possible because any weight addition here would increase the seismic load. This dictated glass, aluminum, or some other curtain-wall type of construction. Martin selected 4-ft-2-in. by 11-ft sandwich panels set in aluminum mullions. The outside surface is self-cleaning porcelain enamel in three shades of blue; the inside, painted steel."

Typical of the executive floors in the building is this view of the 13th floor, looking from the receptionist's desk (left) toward the Flower St. wall. Note custom designed wardrobes (next to columns), screens (perpendicular to side walls), and stationery cabinet (next to file cabinet at left center).

Flexibility in use (particularly those floors which will be leased) is desired and the building interior should be designed to permit expansion and relocation of office units with a minimum of construction change and expense.

"This flexibility was achieved by two design features. First, no interior walls are load-bearing. Second—with the exception of the first floor, the two executive floors, and such permanent service facilities as restrooms, telephone closets, and elevator and duct shafts—all walls and ceilings are demountable. The office partitions were made on the job by glueing three pieces of gypsum board together to form a tongue-and-groove joint. Many of the partitions are merely furniture—in the form of movable coat and file closets. The ceilings are suspended acoustical tile."

The company offices in the building will provide quarters for its officers, the general office department managers, and the staff departments whose work patterns dictate they be available in the downtown area or close to the executive staff of the company's affiliates. The company houses most of its general office staff departments at its base at 4900 Triggs St., Los Angeles. These departments are to remain at the

Triggs St. location, but in some cases the department managers will be located at Flower St. In several instances, personnel is located at Flower St. at this time because of lack of space at the Triggs St. base. The company's operating territory lies outside central Los Angeles, so day-to-day business with its customers will not normally be conducted at the Flower St. location. Personnel at the Flower St. building, in addition to company officers, includes the sales department, public relations department, transmission and supply department, mail-messenger service, mimeograph department, employees' association staff, and the managers of several other departments.

The three Pacific Lighting Gas Supply Co. floors are to contain the entire general office staff of that company. At present these people are housed in rented space in the 810 Flower St. building and in another downtown building.

The general offices of Pacific Lighting Corp. are in San Francisco. The corporation's suite on the 13th floor will contain several offices for use of its executives while in Los Angeles.

Employees will use the existing canteen on the 4th floor of the Southern California Gas Co. building. If this should later prove impractical, either because of over-loading the existing canteen or for some other reason, then a canteen will be installed on the sixth floor of the new building.

"We've installed the plumbing and other 'guts' for a canteen on the sixth floor. This equipment is now being used by a concessionaire who provides coffee for our coffee-breaks. The area which would be used for a canteen is now a meeting room. As a canteen, it would seat about 75."

At the start, approximately 200 employees of the company and its affiliates will be housed in the floors above the first. Approximately 40 per cent of these are women. It is expected that eventually, full use of the building by the gas companies would involve about 350 employees.

The building will be subject to public traffic in that most of the employees of the gas companies in the building will have frequent contacts with the public and government agencies. There will also be considerable traffic between the buildings. Company employees will frequently confer among themselves and also with the staff of the company's affiliates.

The use of each floor will be as follows:

Basement—Major portion leased to Southern California Gas Co., janitor's supply room and storage room, mechanical and electrical equipment that cannot be located on roof.
First Floor—Elevator foyer, inside loading dock, Southern California Gas Co. depth display and customer payment office.
Second Floor—To be leased.
Third Floor—To be leased.
Fourth Floor—To be leased.
Fifth Floor—To be leased.
Sixth Floor—Telephone equipment and operators' rooms, mail and mimeograph department, office of building, provision for future canteen.
Seventh Floor—Southern Counties Gas Co.—rate department, managers' offices of accounting department and construction and distribution department, unassigned manager's office.
Eighth Floor — Southern Counties Gas Co.—sales department, offices of Southern Counties Employees' Association, unassigned manager's office.
Ninth Floor—Southern Counties Gas Co.—executive offices for company officials.
Tenth Floor—Southern Counties Gas Co.—public relations department, offices for manager of customers' department, assistant counsel, assistant secretary, law library.
Eleventh Floor—Pacific Lighting Gas Supply Co. — purchasing department, accounting department, personnel department, conference rooms.
Twelfth Floor—Pacific Lighting Gas Supply Co. —engineering department, assistant counsel, land and right-of-way agent, miscellaneous staff offices.
Thirteenth Floor—Pacific Lighting Corp. and Pacific Lighting Gas Supply Co.—executive offices.
Roof—Mechanical equipment.

"The floors lined up just about as we envisioned them, since considerable thought went into deciding what would go on which floor. The top three floors, for example, are devoted to our parent company and one of our affiliate companies, since they would have relatively fewer personnel and therefore relatively less traffic. And the site set aside for the canteen should be on about the center floor to minimize elevator traffic. Also, the law library had to be in a convenient location for SoCal law personnel, as well as the two companies in the new building.

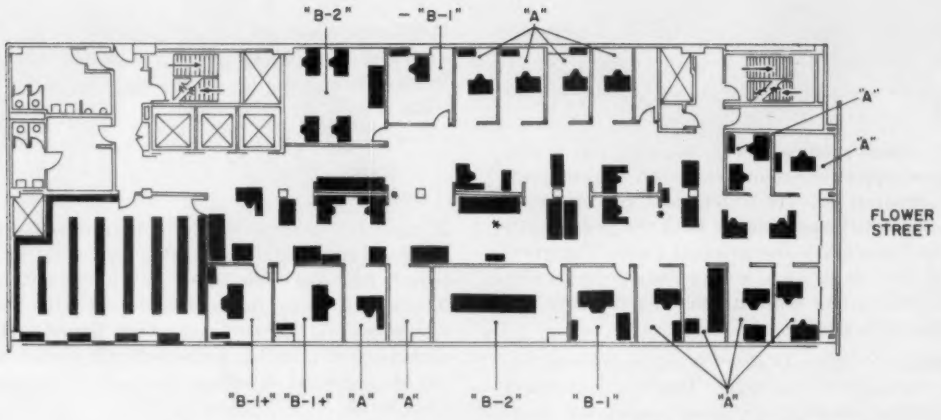
"One of the very few changes was in transferring the employees' association office and the unassigned manager's office from the eighth floor to the sixth floor to give the sales department more room to grow in the immediate future.

"At one time during the planning, we thought of making the seventh floor available for leasing, since the architect had come up with such an efficient floor plan. He counseled against this, however, and he was right, for we would already be bulging at the seams if this had been done."

Air Conditioning

The design shall include absorption-type all-year air conditioning to serve all floors. The first floor cooling shall be sized to provide for spillage through the large open passageways into the adjacent Southern California Gas Co. building. The spillage cooling will be used to supplement the air conditioning within the first floor of the existing building.

The location of the mechanical equipment rooms is to be determined as indicated by best economy, maintenance, and floor space utilization within the limitation that no such equipment rooms are to be located on the first, ninth, or thirteenth floors. Locating the equipment on alternate floors or every third floor will be an acceptable arrangement to the company.



The tenth floor has the largest variety of office sizes and partition types. Housed in the offices are the public relations department, the customers department manager, the assistant counsel, and the assistant secretary. Partitions between these offices are either ceiling height or 5 ft 8 in., while those in the central area are 3 ft 4 in. At lower left is the law library.

"We had planned on a low pressure—½ oz—air conditioning system. But the architect talked us into what was then a high pressure system—5½ oz—but is now regarded as only a medium pressure. Only the third such system in southern California, it was a key to the architect's efficient design because of two very distinct advantages. First, it allowed smaller ducts and air shafts. Smaller ducts meant we could work within the 11-ft floor-height requirement and smaller air shafts meant less wasted floor space. The second advantage was that all air handling equipment could be put in only two locations: the basement—to handle the first six floors; and the roof, to handle the top seven floors."

It is intended that the air conditioning equipment and boilers be operated unattended unless code requires otherwise.

"This sentence drops the hint to the architect that we wanted a low pressure boiler system—unless he could prove that a high pressure system operating at above 15 psi would save more than the cost of the continual operator in attendance, as required by law for such systems. We ended up with a low pressure boiler. It's on the roof."

No more air conditioning zones are to be included than are needed for reasonable control over temperature and ventilation, taking into account occupancy and the hour-to-hour and day-to-day changes in level or room activity. In this connection though, the air-conditioning design should provide allowance for changes in floor layout that may be required by future alterations.

"The average number of zones per floor is 18."

Sound transmission through the ducts from the mechanical rooms to office areas, as well as voice travel from office to office, are objectionable features which should be minimized.

Layout of 6th Through 13th Floors

The office layout should be dictated preferably by work patterns and utility. Private and semi-private offices are divided into five types. All offices of each type are to be of the same size:

A—Semi-private offices, 100 to 125 sq ft, obtained by attractive dividers or screens which allow air circulation both under and over the screen. No separate air conditioned zone.

"The area figures for the various types were only approximations, since the exact size depended on the building module. However, the final sizes all fell within the specified latitudes. The Type A office has 115 sq ft and a 5-ft 8-in. movable partition surrounds it."

B-1—Full partition, 170 to 200 sq ft, separate air conditioned zone, carpeted, coat closet. Will be used to house an executive of the department manager level or in some cases several staff employees.

"This type worked out to 175 sq ft. It has ceiling-high, movable-type partitions and is carpeted when used as a manager's office. One thing we were able to eliminate—not only here, but throughout the building—is the built-in coat closet, which in our climate has proved to be pretty much a waste of space. Further, it is expensive and decreases flexibility. We substituted custom-designed, free-standing wardrobes which act as dividers or partitions. This involved quite a selling job to personnel, as people used to things like built-in coat closets are hard to convince that even a custom-designed substitute can take their place."

B-2—Same type office as a B-1, except with about twice the floor area. Will be used to house three to five staff people. Preferably should be designed so it can be divided into two B-1 offices later by alteration.

"The B-2's are 350 sq ft, exactly double the size of the B-1, which they closely resemble, except that they have the vinyl-asbestos tile floor used virtually throughout the building."

C—Vice president level, 225 to 300 sq ft, full

partitions, separate air conditioned zone, carpeted, coat closet.

"The area is 230 sq ft and the full partitions are plastered, but there is no coat closet."

D—President's office, 350-plus sq ft and a secretary-receptionist room, carpeted throughout, sound-proofed private toilet, coat closet, separate air conditioned zone in both the president's office and secretary-receptionist room. The president's office is to have a door that permits exit to the floor lobby without passing through his receptionist's room.

"The president's office is exactly 350 sq ft and follows the functional specs except that the coat closet was eliminated. A dressing-room-type closet, however, was incorporated into the toilet."

The five types of private and semi-private offices will be referred to in describing the requirements on each floor.

The material in Appendix 3 and 4 will be an aid in understanding requirements. Appendix 3 contains the company's general office organization charts. This covers personnel both at Flower St. and at Triggs St. Appendix 4 is the executives, departments, and working groups to be housed at Flower St. and gives the number and types of private offices and desk space required for each group. Similar material is presented for Pacific Lighting Corp. officers and the Pacific Lighting Gas Supply Co. in Appendixes 6 and 7.

"It was our impression that all these charts and diagrams proved most helpful to the architect, who usually had to dig out such information."

Generally, the company office arrangements will be centered around areas for each department or work group with a prescribed number and type of private offices. Each department or group area will have its own reception-secretary-staff area into which the private offices will open. Department employees not having private offices will be located in the staff area. The staff offices, in general, will be nominally more spacious than offices where strictly routine work is performed. The arrangement should allow several chairs to be placed around desks when consultations are in order. There should be space for a moderate amount of file cabinets. Also, aisleways and space to serve as reception for the private offices should be allowed. Each department or unit area shall have direct passageway to the elevator-service area without passing through other departments. Each department area or unit area is to have a storage coat closet. In some cases an additional storage room is also specified.

"Here again, the closets were eliminated in favor of free-standing units."

The layout and design may be devised so as to minimize the need for partitions. Full enclosure of each department area is not a requirement. Screens and similar devices may be used to provide a degree of privacy and separation. It would be acceptable to arrange the layout of the private offices so they provide the separation between the various work areas. Adjusting room sizes and locations of staff offices to conform to building column modules, as required by design, is contingent on the final building structural plan.

"The enclosure screens mentioned in the second sentence took the form of 40-in. high divider screens."

Minimizing hallway space is definitely desirable. Arrangement so that the traffic patterns do not interfere with work routines is, of course, necessary. There will be no floor receptionist with the possible exception of the two executive floors. Appropriate directors or suitable and aesthetic means of indicating department locations is to be included on each floor level.

"Short corridors are provided only at stairwell landings on several of the floors where restroom facilities and entrance into the adjacent SoCal building require passageways."

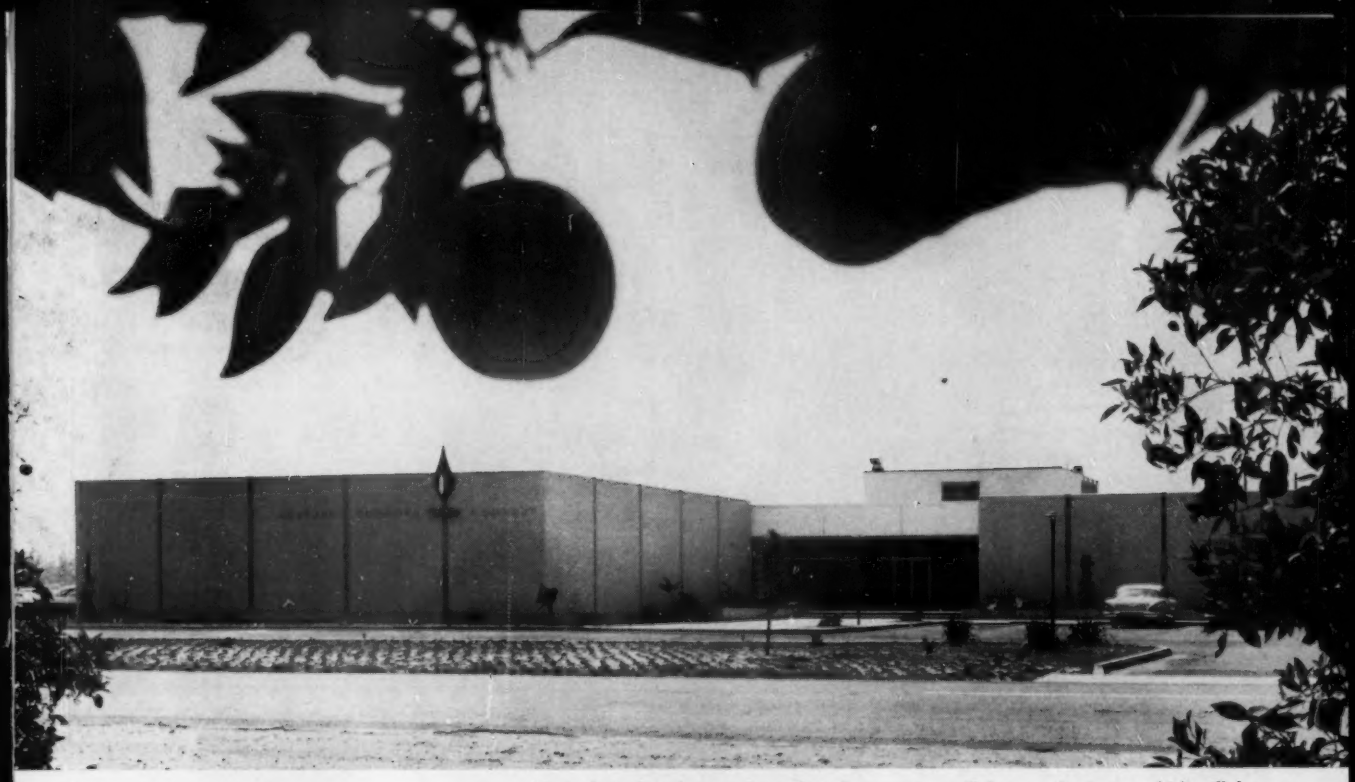
Flexibility in design and arrangement should, insofar as practical, permit expansion so that each department may be expanded in a pre-planned manner. In this regard, floor layout may be planned so that a major unit may be considered to have first call for all space on one floor, with other occupants using the excess space subject to the major department's needs.

"The architect made maximum use of the flexibility afforded by the absence of load-bearing walls. His plan was to locate the main stairwell behind the elevators instead of the customary place in a long narrow building—strung out along the back wall. This saved considerable space. Putting one of the air shafts in that core saved more space. The area thus saved ended up as office space."

The following sheets list requirements for each department or group and indicate the floor where each office area may be located.

The architect may suggest shifting integral department units from one floor to another where this is required for proper balance of space use. Also, where there is more space on a floor than required to meet the needs specified, additional Type B offices, together with a secretary-reception area, may be included to round out space use. Several additional offices of this type would be useful in meeting company expansion.

"Certainly, one additional comment should be made on these functional specifications. They have resulted in improved buildings for us; but you could give these same specifications to another company and not have equally good results. Functional specifications should, first of all, present a completely honest picture of the company. But there is something more than just the conditions in the specifications, and that is your working relationships with your architects. Often, an architect draws as many conclusions from things he observes about your company and its people as from the things you say and write down. You've got to make sure your objectives are understood and believed. If you're not satisfied that an architect really understands and believes, you'd better start looking for another one."



"It is desired to have a base that the company will be proud of; one which will have eye appeal but which at the same time will not convey an impression of plushness."

Southern Counties HOUSES itself

A pictorial portfolio of the Orange County Division Headquarters

Captions excerpted from the functional specifications for that facility

ORANGE county, home of Disneyland, the Laguna Beach art colony, and swank Newport Beach, has often been called the fastest growing county in the country.

Southern Counties' records offer substantial evidence that this is a legitimate claim. The company now has 208,500 meters in its Orange County division, more than five times the 41,000 meters it had 20 years ago. So great is this growth that the division adds three new people to its accounting and customers departments every two months. So quickly do new towns spring up, new streets and mains go in, that every two months, the master street map must be updated—and it takes two men two days or longer merely to make the additions.

And this is really only the beginning for Orange county. There are still miles of orange and avocado groves and one of the largest ranches in the country will only be partially used up by a large city, university and industrial complex now in the planning stage. Some of the nation's biggest corporations are just now beginning to locate plants in Orange county.

How does Southern Counties hope to cope with all this? It was inadequately equipped for the job until it moved into the new base on March 7, 1960, from four different antiquated, cramped locations in Anaheim and Santa Ana.

The planning behind that move began several years before. Projecting all the information it could get, the company determined where the load center for the division would be in 20 years, then sought a piece of property as near to that center as possible.

The company purchased 20 acres of orange grove not far from the Santa Ana freeway. The state took 1.7 acres for streets, leaving 18.3 acres. The new base used up 8.3 acres and company officials figure they will use about half of the remaining 10 acres, probably sell the rest.

"The new base will in general include:

"An office building to house the four departments;

"A warehouse building to supply customer servicemen and construction and maintenance crews with fittings, tools, and supplies;

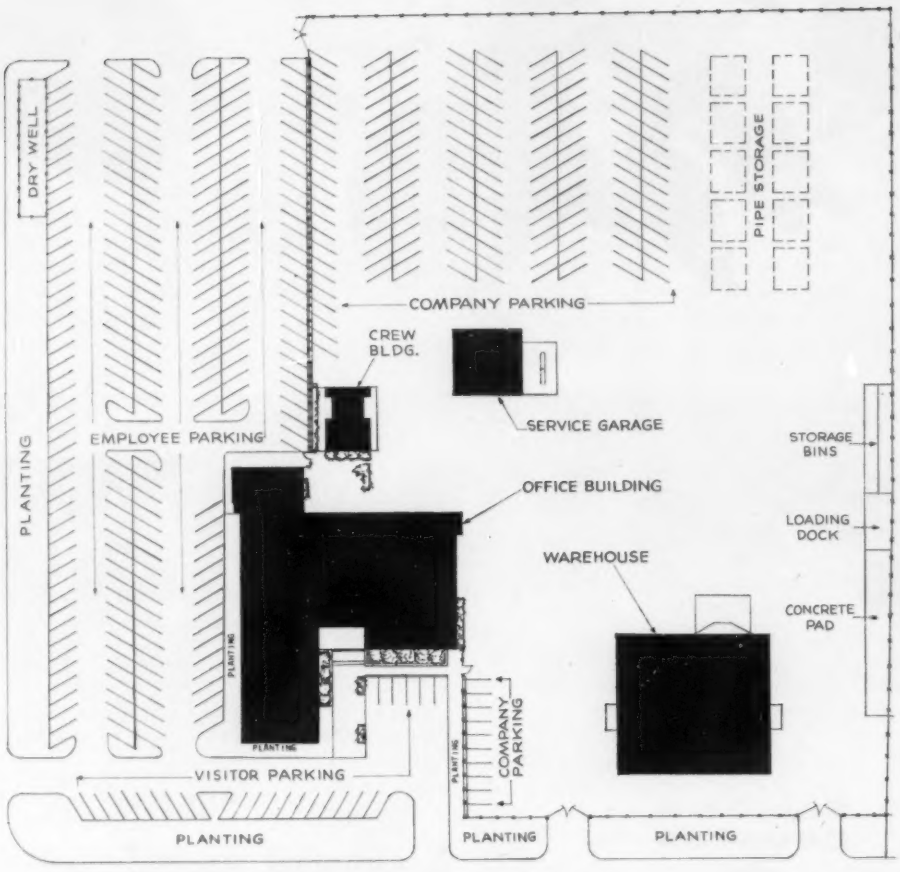
"Wash, toilet, shower, and locker facilities for field crew personnel;

"Facilities for outside storage of pipe and such items as rock, sand, road paving mix, and pipe junk;

"A garage building for a service station type operation for fueling, greasing, washing, and incidental maintenance of automotive equipment;

"A paved yard for night storage and servicing of company cars and trucks;

"Separate paved employee and visitor parking areas."



The company went through the same sort of functional specifications procedure as for the new general office. Then, following its usual procedure of choosing from a field of local architects, the company selected the firm of Pleger, Blurock, Hougan, and Ellerbrock.

As shown on the following pages, the functional specifications gave a graphic picture of the division's operation and fairly well defined the type of installation required: an office building, a warehouse, a service station type of garage, a crew wash building, employee and company vehicle parking areas, and outside storage areas. Total cost was $640,000, including $523,000 for construction, $68,000 for engineering and inspection, $31,500 for architectural fees, and $10,500 for engineering and inspection.

The one-story, air-conditioned, 20,368-sq ft office building cost $280,000, or $13.75 a sq ft. Built on a concrete slab, its construction is a combination of porcelain enamel curtain wall panels and tilt-up concrete. Interior partitions are gypsum board on wood framing. Wood decking was used for the roof.

The 11,125 sq ft warehouse cost $100,000 or $8.99 a sq ft. It uses concrete tilt-up walls exclusively and steel roof framing and decking. A 200-sq ft air conditioned office is included.

The 2283-sq ft garage cost $28,000, or $12.26 a sq ft. Construction features are both concrete tilt-up and porcelain curtain-wall panels and steel roof, framing, and decking. Facilities include an 800-sq ft wash area, two hoists, two gasoline pumps, a 10,000-gal. gasoline storage tank, a 500-gal. waste oil tank, and overhead oil, water, and lubrication reels.

Most expensive of the four structures, at $21.32 a sq ft, is the $25,000, 1159-sq-ft crew wash building. Included in these costs, however, are a water softening unit and primary electrical distribution services for the entire facility.

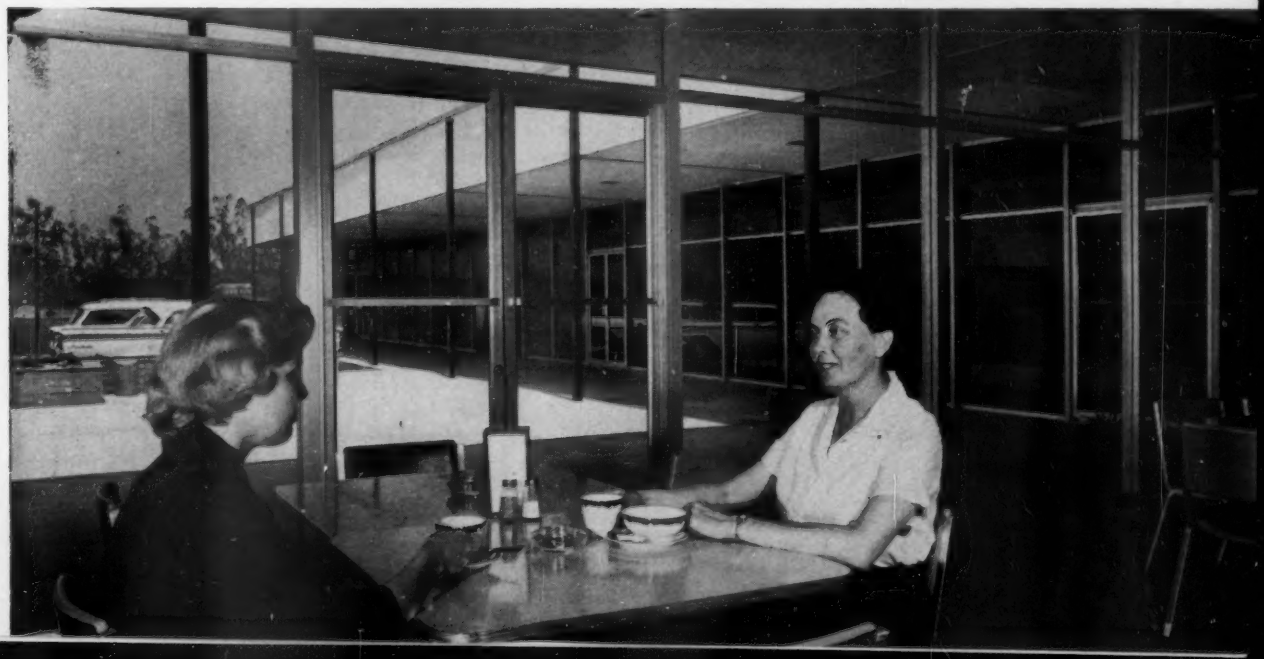
What of the future and all that customer growth? Situated as they are, both the office building and the warehouse have plenty of room for expansion. This flexibility is particularly true with the former, which has curtain wall side and rear elevations. One of the company's means of keeping up with the growth lies in automated office procedures, according to Monte Temple.

"We'll probably still be at the same location in the year 2000," he adds, "In the meantime, we'll keep updating our master plan every five years. In 1965 for example, we will probably call the original architects back and say: 'This is what we have done to your brain child. What can be done to further facilitate handling our work load?' This may or may not result in some construction."

"The entry shall be modern in appearance and open into a reception area containing a small amount of reception furniture with room for display of two gas appliances."

"The classroom will be a multi-purpose meeting-demonstration room, sized to seat 40 to 50 people at one end for setting up demonstration equipment and a wall blackboard. The classroom will be used for training customer servicemen, for employee group meetings, and for live appliance demonstrations to small groups of architects, builders, customers, and employees."

"Entrance ways to the canteen should be arranged so that traffic will not disturb people working in office space and so that outside servicemen can use the canteen without passing through offices."



Organizational charts from the functional specifications were translated into floor plans

"A clear understanding of the general functions of each of the division departments is essential to the proper planning of building and plant facilities:

"Sales department is responsible for securing new customers, retaining customers, and increasing gas use by all;

"Customers department is responsible for customer contacts for information, service requests and bill payments, customer appliance adjustment, and meter reading;

"Accounting department is responsible for work order processing, customer billing, and payroll accounting;

"Operating department is responsible for construction, maintenance, and operation of pipelines and similar gas distribution facilities, and for purchasing, stores and transportation.

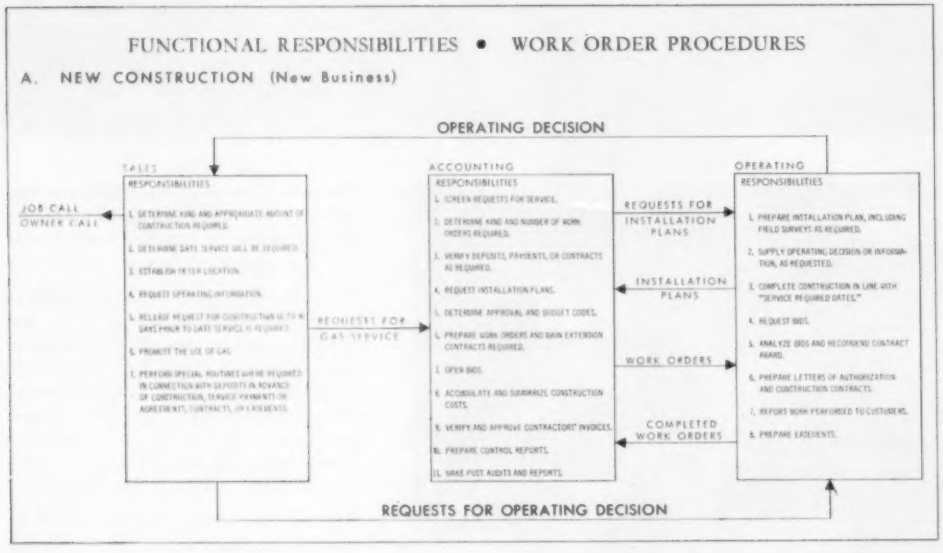


Exhibit 2

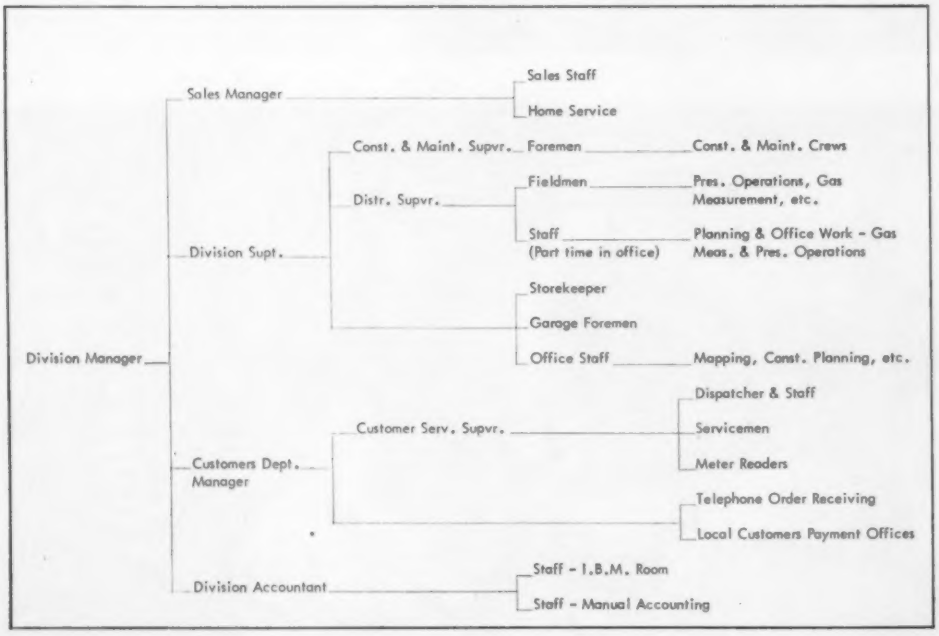


Exhibit 3

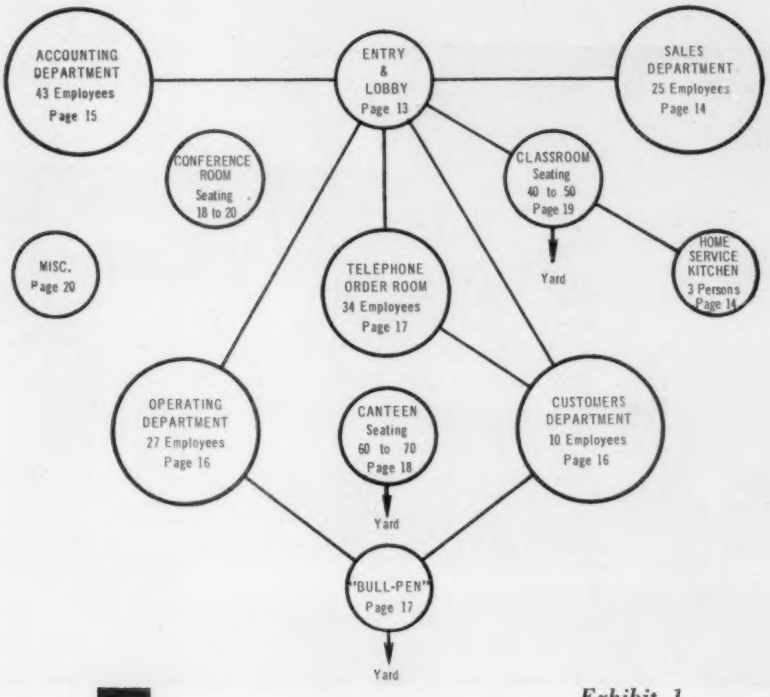
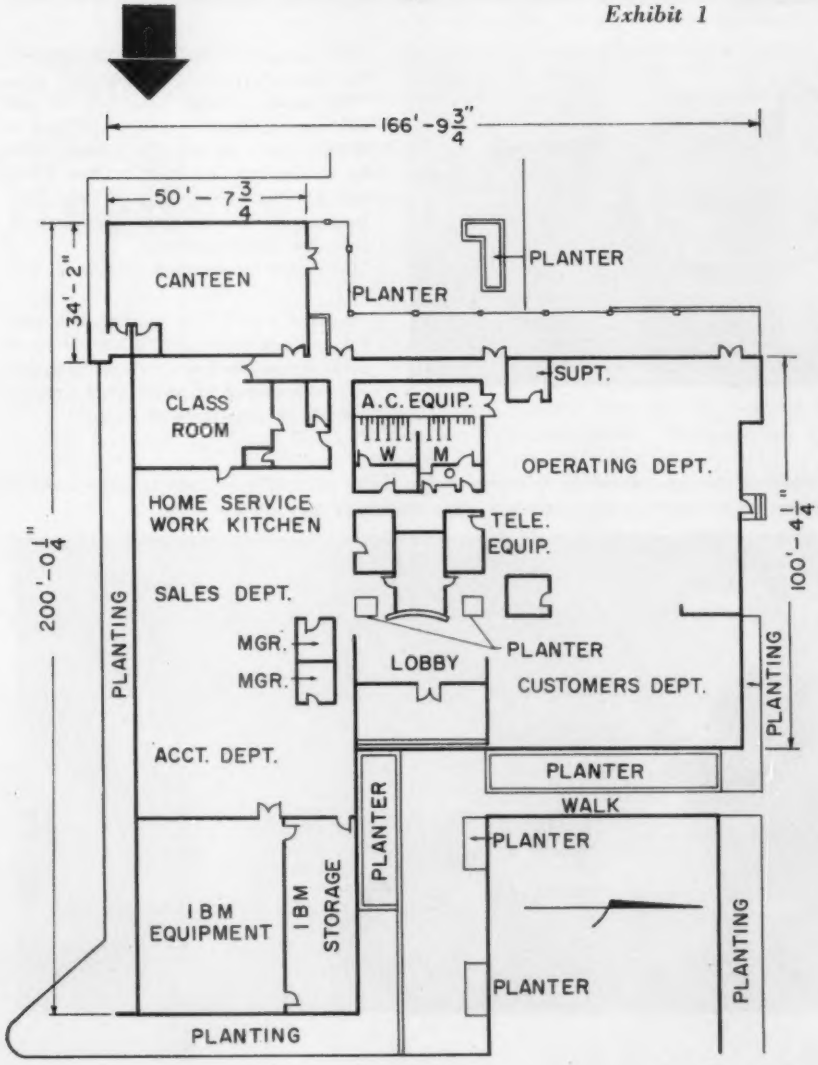


Exhibit 1



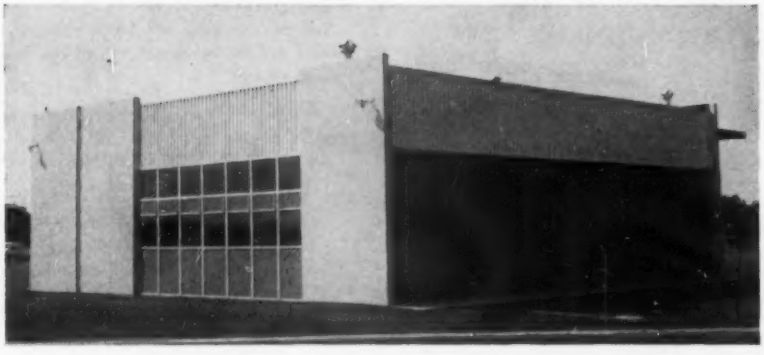
"The office building will include quarters for each of the four departments, a small reception area at the entry, a conference room, a canteen, and a classroom.

"Generally, each department's quarters will consist of an office for the department head and an open staff area. The company system-wide pattern of division department head private offices calls for a size around 150 sq ft in area. No private office will be provided except for the heads of each of the four departments.

"The sales departments may likely have more outside callers than other departments and should be located convenient to the lobby and entrance.

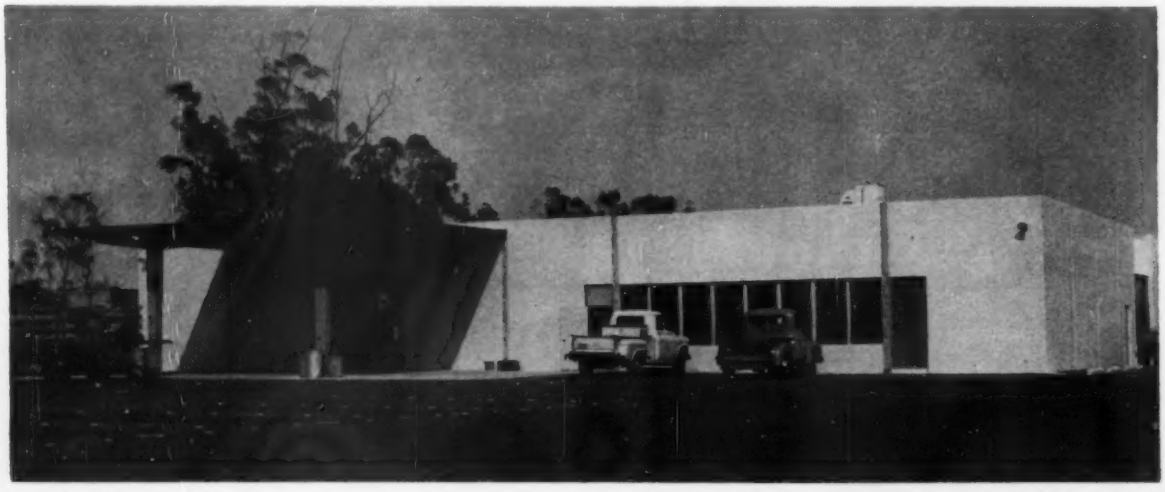
"The operating department and the customers department each will have field men reporting to the staff area in the morning to pick up orders and in the afternoon to turn in the completed orders. This will establish a traffic pattern to the yard area.

"An arrangement may be considered that combines the operating department's and customer service department's staff areas in one large room, with a combined bull pen area for the field men's use in reporting and receiving instructions."



"The garage building shall be designed for 'service station type operation' with:
"Two gasoline pumps (one type of gas only), a 10,000-gal. gasoline tank, and a 500-gal. waste oil tank. The pumps should be arranged or equipped so that trucks may be filled from either side. There is to be a canopy over the gasoline pumps and lights for night operation;
"Two hoists for greasing (one truck, one car);
"Enclosed area for car washing with gas, hot, and cold water, and 220 volt electrical outlet for possible future car washing equipment—illuminated to permit night washing —overhead arms for wash hoses."

"The warehouse building will have these additional features: A canopy to permit loading during rain; lights sufficient for night loading; no exposed steps or rails for trucks to run into; full perimeter access; windows in office overlooking pipe storage area."



Conclusion and comment

Southern Counties HOUSES itself

WE hope the preceding 18 pages have shown how satisfactory the functional specifications approach has proved to Southern Counties management.

With very few exceptions, it has proved just as satisfactory to Southern Counties employees. While very few Orange County Division people, for example, had an inclination toward contemporary architecture before they moved in, they quickly became "unanimously and completely overjoyed" with their new home. And whereas it was once difficult to recruit new employees, there is now a continual stream of unsolicited applicants.

"Perhaps the most ardent enthusiasts of the functional specifications approach are the architects themselves. Consider these three glowing tributes from three different architects:

"I wish more clients could detail their requirements with such care and completeness."

". . . refreshing and indeed highly beneficial to those from whom you seek professional proposals."

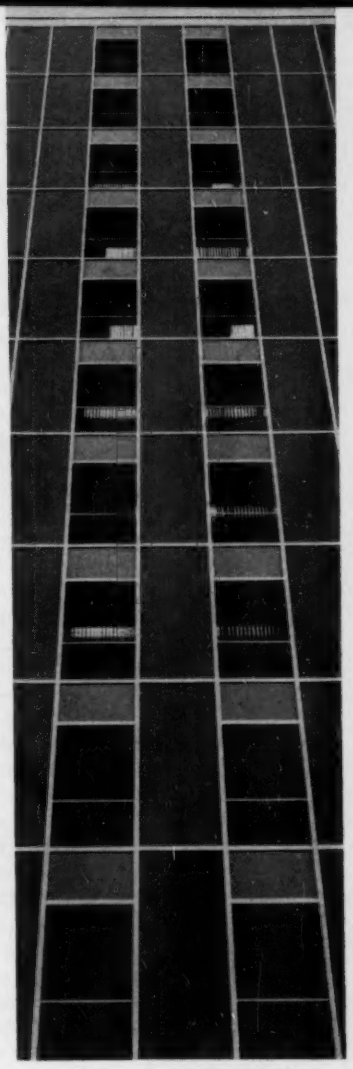
". . . the finest, the most intelligent, stimulating, and comprehensive program we have ever received from a client. Almost invariably the architect must sit with officers and committees at endless meetings to even start a building program."

And what is the reaction of the public—which knows nothing of these functional specifications? There is a certain element that never will be convinced the utility business is anything but a gold mine. The undersigned became aware of that fact as he was taking the photo on the right. We were practically on our knees on the sidewalk, trying to get the best possible angle. A fairly well dressed gent came along, paused, looked down at us, pointed his cane at the building and said: "Young man, you should have all the money they have!"

While such people will continue to retain old impressions of marble monuments—others who are more in tune with this it's-smart-to-be-thin, to-drive-a compact-car-age—cannot help but be impressed with the corporate belt-tightening that results in what Jay Davis calls "a building less than half-way up the bare-bones-to-plush scale."

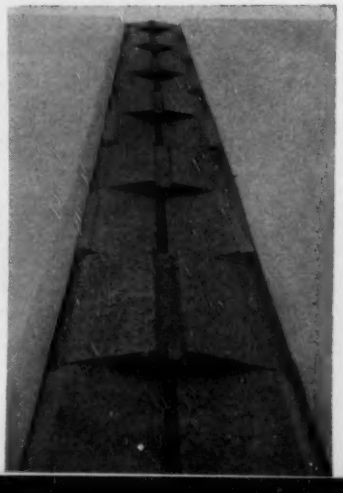
And to anyone who happens to be even somewhat architecturally or artistically sensitive, the buildings resulting from the functional specifications approach are statements of the architect's at-least-partial emancipation from the corporate father-client image. Such a person has only to note the limited but fine walnut detailing in the Orange County Division office; the beautiful patterns in black-brown, burnt orange, and putty in such normally prosaic structures as the garage and warehouse—and that person may very well conclude that Southern Counties Gas Co. is playing a considerable role in ushering in a new era in gas industry architecture.

—Robert Clay

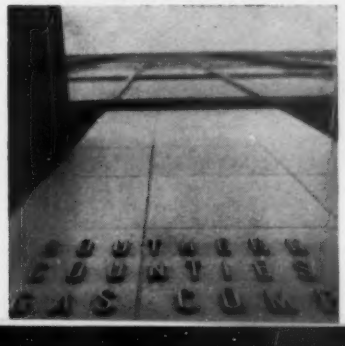


Pattern formed by one of the pairs of vertical stripes of windows on the curtain wall of the new general office building.

Pattern formed between tilt-up concrete panels at the Orange County base by alternately angling-in and angling-out vertically-stacked, two-brick courses of roman brick.



Knee-high view of the 13-story general office building.



New method speeds main installation

A NEW time-saving method of installing underground gas mains is said to result in substantial installation economies and lower public hazard of open ditches during construction.

In a typical expanding community, a 4-in. main was needed to serve a new school and residences. The 3000-ft extension crossed many street and road intersections and residential driveways. It also passed through an area bordered by irrigated orchards. No section of the ditch could remain open overnight.

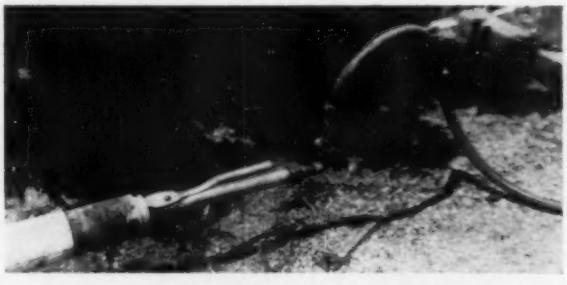
These conditions indicated installation of the main in 10 sections, varying in length from 160 to 400 ft. Each section was assembled and pressure tested before being dropped into the ditch. Seven of the 10 sections were pulled into position through bores under intersections or driveways or under existing water services. Individual sections were tested with test plugs made by Anderson & Grunsky Co., Santa Cruz, Calif.

The installation method described in the photos has been used by this crew for four years. During this time there has never been a failure in the test plug and puller. Tool maintenance cost has been zero.

While cost savings will vary with different conditions, on this specific job, the elimination of welding time for two caps on each of 10 4-in. pipe sections is estimated at a conservative 20 minutes per end, or $6\frac{2}{3}$ hr for this job. This estimate does not include time of a helper or time required to move and position welding equipment. A projection of such savings shows a full amortization of tool costs within the first year. ■

Test plugs are inserted manually into each end of section. Closing of cam lever brings gripper dogs firmly against inside pipe wall and expands a rubber gasket. Positive seal is thus created, which becomes stronger as internal pressure is increased. Plug insertion and sealing takes 10 seconds.

A capped plug is used at one end of pipe section (above). Plug at other end (below) is fitted with valve and hose connection to air compressor. All section welds were soap tested for leakage and then wrapped with protective coating. Removal of test plugs is also a 10-second operation, requiring only lifting of cam lever after pressure has been exhausted. (The testing phase of this operation eliminates welding caps on each end of each of the 10 pipe sections in this line.)



After testing (lower right), sections to be pulled through bores are fitted with a pipe puller. This slips inside pipe; gripper dogs hold puller by an internal spring.

Left: A cable previously pulled through the bore, pulls pipe into place. Although several sections were pulled through a slurry of liquefied mud, less than a small handful of mud entered the pipe interior, and this only a few inches. Puller is then instantly removed and sections are welded. Experience shows that welding bevels remain completely flush, face against face.

Industry to grow, grow, grow in 1961

- **AGA and CGA heads predict dynamic development for the gas industry in '61 in spite of softness in economies**

AMERICAN gas companies will break new record highs set in 1960 by doing more business and expanding at an even greater rate this year. Canadian gas companies will drive ahead with steady, if not spectacular, growth, which will be a vital part of that nation's economy in 1961.

These are summations of annual business reviews by the presidents of the American Gas Association and the Canadian Gas Association. Lester T. Potter spoke for AGA; R. C. McPherson for CGA. Their appraisals forecast a record year for the North American gas industry during '61.

Looking at construction, U. S. gas companies should top $2.2 billion in expenditures for new facilities in 1961 alone. The Canadian natural gas industry predicts a $1-billion construction expenditure between Jan. 1, 1961 and Dec. 31, 1965.

The reasons for this physical growth are: (1) intensified sales efforts, (2) increasingly effective service to present customers and consumers of the future, (3) development of further improved and advanced utilization and equipment for all classes of consumers, and (4) better communications with the consuming public which is spreading the truth about natural gas' advantages and modernity.

Gas Appliance Manufacturers Association also predicts big things for 1961. Substantial sales increases are anticipated for all major gas appliances and equipment categories this year. GAMA reports its year-end survey indicates sales will exceed 8.7 million units, excluding gas refrigerators, air conditioners, and gas lights. This reflects an increase over 1960 sales, which hit about 8 million units.

Potter pegged PAR as the spearhead of the drive by the American gas industry to protect and expand gas markets in the energy industry's most competitive decade. PAR invested some $7.25 million in gas sales promotion, research and public information during 1960.

This year, PAR plans to kick-off its first industrial gas promotion program. It will promote in depth new gas applications in the metals, textile and chemical industries.

Campaigns striking hard for gas heating and gas air conditioning will be greatly expanded in 1961. These appliances will enjoy the second highest investment in gas advertising in terms of dollars.

The Gold Star range program will continue to be the number one advertising target (in dollar volume) by PAR in 1961. More than half a million dollars of AGA and Gold Star funds was spent on this family of gas cooking appliances in 1960.

Public Information and Research, as well as the AGA Labs, will again carry their dynamic impact to gas consumers and potential customers for the nation's 1400-plus gas companies.

As AGA's President Potter said: "In a most thorough and business-like way, this industry is projecting itself into tomorrow and, more important, preparing to meet its challenges with the most aggressive and imaginative action programs in the history of the gas business. With these programs, we believe we will achieve more spectacular growth and strength in the Sixties than in the past 100 years."

In Canada, 1960 was described as a breathing spell for the gas industry. This followed a period of unrivalled expansion. Even so, 1960 saw Canadian gas companies bring about a 21 per cent increase in gas use. Some 85,000 new customers were connected to gas mains in Canada during 1960. Sales were boosted to $220 million during the year.

CGA's President McPherson said: "The industry now has 1.15 million customers and the National Energy Board forecasts that national consumption will have reached 650 billion cu ft a year by 1965 for an estimated income of more than $450 million. This amount does not include the value of export sales of gas to the United States. It therefore would appear that with aggressive sales techniques, plus the superiority of the product over other forms of fuel, a good percentage of this gain in business can be achieved in 1961.

"On the export front," McPherson explained, "by 1962 seven new pipelines will be carrying an estimated 400 billion cu ft of natural gas across the border to the United States for a value exceeding $100 million; this compares with 85 billion cu ft of gas exported in 1959 for a value of $17 million."

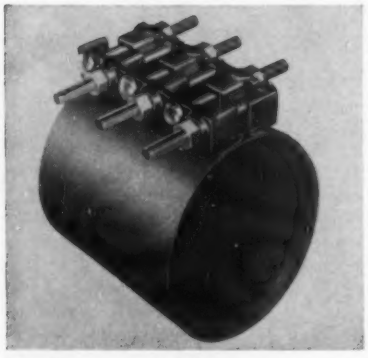
He estimated the Canadian gas industry's construction expenditures through 1965 as: $500 million for transmission and gathering; $250 million for processing plants; $150 million for developing additional reserves; and $100 million for gas distribution.

More news on page 74

GAS DIGEST

New Products and Trade Literature

For more data on any of these items use the Readers' Service Card on pages 69, 70



1. Clamp coupling

Smith-Blair's Type 210 full-circle clamp coupling has "all the bolts on top" (GEC-370). Special lug design and alternating bolt arrangement provide high mechanical strength, good sealing power, lower initial cost. Heavy-duty design insures permanent repair and easy installation.
Smith-Blair Inc.

2. Chart changer

Barton's automatic chart changer can be used where measurement and recording of gases is accomplished through a circular chart-type recorder (GEC-750). With the new changer, a recorder can operate unattended for 16 days, using a 24-hr chart for each day.
Barton Instrument Corp.

3. Outdoor grill

The all-new Charmglow Perfect Host portable outdoor grill uses a web of gas jets beneath a bed of permanent Char-Rock to reach perfect broiling temperature in less than five minutes (GEC-240). Drippings from the food on the grid produce the same charcoal-broiled flavor as actual charcoal.
Gaslight Illinois Inc.

4. Base station

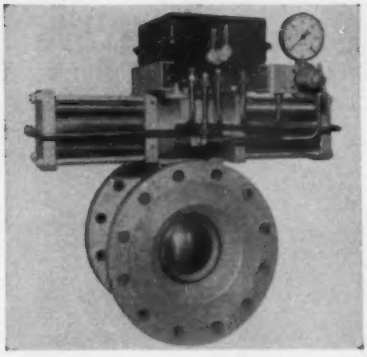
Motorola has expanded its two-way radio base station line with new desk-top and high-powered models (GEC-140). The consolette station is designed for easy installation on a desk. It is only 15 in. long, 18 in. wide and less than 9 in. high.
Motorola Inc.

5. Aluminum meter

The compact AL-425 meter, with ample capacity for small industrial or commercial loads, has been added to American's line of light weight Aluminumcase meters (GEC-560). It operates at only 5 rpm per cu ft, providing greater accuracy, longer meter life, and resistance to impact damage.
American Meter Co.

6. Voltmeter

The Dacca pipe-to-soil voltmeter is a potentiometer - voltmeter designed to give non-engineering personnel a simple, suitable meter for routine testing (GEC-110). It accurately measures pipe-to-soil potentials under any resistance conditions.
Agra Engineering Co.



7. Automated positioner

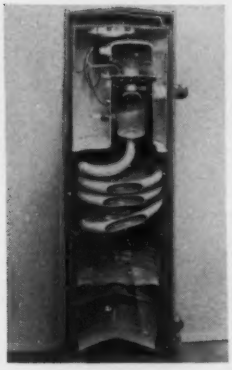
Field reports show that the Bailey positioning relay, used in conjunction with the Jamesbury ball valve and pneumatic operator, automatically controls flow through pipelines (GEC-750). The positioning relay serves as a throttling device that automatically positions the valve to any desired rate of flow.
Jamesbury Corp.

8. All-purpose vehicle

The "Scout" is International Harvester's new compact, all-purpose vehicle (GEC-790). Design features include integral pickup body, detachable hardtop cab and detachable doors. The new unit also will be available with a detachable steel enclosure for both passenger compartment and load-space area.
International Harvester

9. Gas lamp

Humphrey has introduced its new gas lamp, the Satelite (GEC-470). Featured is a substantial increase in brightness. It is achieved by using half-frosted globes, made of heat-resistant Pyro-Glass; by using high temperature ceramic nosepieces; and by true design of the burner.
Humphrey Products Div.



10. Water heater

A new domestic, gas-fired water heater operates on the principle that powered the German V-1 rocket during World War II (GEC-860). Main parts of the Pulsamatic's combustion unit are diaphragm-operated gas and air inlet valves, a combustion chamber, and a coiled nickel-tube for heat transfer to the surrounding water.
Reeves Brothers Inc.

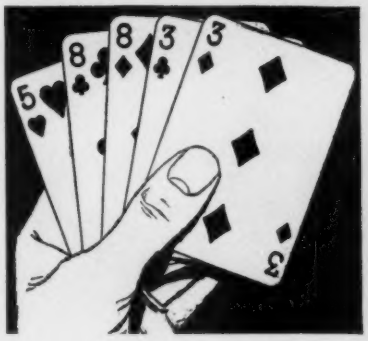
11. Flow alarm

Protection against hazard due to failure of gas flow to a heat treating furnace is provided by the Waukee Flo Alarm (GEC-710). The photo-electric principle is used. When a light beam, focused on the photo-electric cell, is interrupted, Flo-Alarm sounds a warning or operates a purge system.
Waukee Engineering Co.

12. Two-way radio

Hammarlund has introduced its full-powered, business two-way radio system in a low cost, fully versatile unit (GEC-140). The Outercom is a single, universal unit, completely self-contained, that serves as both receiver and transmitter. Controls are mounted on the front panel.
Hammarlund Manufacturing Co.

POKER? Play to win!



How would you play this hand?

You'll be the high hand before the draw about 3 times out of 5, but the odds are roughly 12 to 1 against helping on the draw. Odds are better than even somebody will beat you. Don't open. Don't call. Tough? Yes, but be patient...and win.

Here's a sure winner from FORD:

Ford pays half your fuel bills for a full six months (or 400 tractor hours) on the purchase of any new Ford or Fordson diesel tractor.

This offer, made possible by the amazing fuel-saving performance of these low-priced diesel tractors, expires March 31, 1961.

No "hidden" price increase... no tricks of any kind. See your Ford Tractor Dealer for all the money-saving details!

Tractor and Implement Division, Ford Motor Company, Birmingham, Michigan

Ford
TRACTORS EQUIPMENT

13. Radio transmitter

Motorola has introduced its fully transistorized FM radio transmitter which operates on standard VHF two-way mobile communications frequencies (GEC-140). The Handie-Talkie pocket transmitter is designed for operation on frequencies between 25-54 mc and 132-174 mc. It provides 500 milliwatts RF power output.
Motorola Inc.

14. Gas dehydrating unit

A new dehydrating unit provides complete, continuous, moisture removal (GEC-270). The Dehyditrol is a self-contained unit for completely dehydrating compressed air and other compressed gases. The units provide greater accuracy in lab tests, increase flow efficiency, eliminate corrosion, and prevent hydrate formations.
Gas Drying Inc.

15. Rotary air compressor

A new 125-cfm rotary portable air compressor, with increased hp and designed to reduce service costs, is introduced by Le Roi (GEC-010). The new unit is powered by a Le Roi D226 wet sleeve engine. The 53-hp engine provides 60 per cent power surplus. Engine features: stellite exhaust valves and valve seat inserts and valve rotators.
Le Roi Div.

16. Reading manometers

The Spek-Scope offers an accurate, safe and convenient method of reading high-range manometers (GEC-540). Consists of a stationary mirror bracket which can be clamped into position at operator's eye level. This bracket is designed so that readings taken at "top" and "bottom" legs are reflected on specially situated mirrors.
Spek Instrument Co.

17. Spot heater

A small, efficient portable industrial spot heater is being marketed by Union Chill Mat Co. (GEC-410). It is designed for use in hard-to-heat areas and as standard equipment for outdoor utility and maintenance crews. The Red Rocket Shorty is 36 in. high, 17 in. in diameter and weighs 24 lb.
Union Chill Mat Co.

18. Line-up clamp

A pneumatic pipe line-up clamp for small diameter pipe has been developed by Crutcher-Rolfs-Cummings (GEC-650). Pipe as small as 12 and 14 in. can be lined up as accurately as pipe ranging from 16 to 36 in. diameter. The unit measures only 58 in. long and weighs 215 lb. It features pneumatically controlled heads which operate independently.
Crutcher-Rolfs-Cummings

TRADE LITERATURE

22. Air conditioning

New literature explains the operation and advantages of the various Gascool air conditioning units available from Vector Engineering Contractors (GEC-020). Colorful brochures, specification sheets, and other explanatory material are offered.
Vector Engineering Contractors

23. Actuators

Conoflow Corp. has issued Bulletin B-1020-7 covering pneumatic spring and diaphragm actuators (GEC-820). The rugged, versatile units are available in complete valve assemblies to customer specifications.
Conoflow Corp.

24. Flame-cutting

A complete line of Oxweld flame-cutting machines is described in a 28-page catalog from Linde Co. (GEC-780). Machines covered in Form 1396 range in size from small, handy portable machines that can be carried around by one man to huge multi-torch, shape-cutting machines capable of reproducing tens of thousands of the most intricate shapes and patterns in steel.
Linde Co.

25. Backhoe

Parsons-Shawnee 1500 backhoe is described in a bulletin from Parsons Co. (GEC-210). The four-page bulletin illustrates and describes the backhoe's many exclusive features.
Parsons Co.

26. Gate valves

Gate valves designed specifically for ductile iron are described in OIC Valves Form 1011 (GEC-820). Described are both the Pipe-Pal series of ½- through 2-in. small gate valves and the Pipe-Mate series of 2- through 12-in. large gate valves.
OIC Valves

27. Water heater manual

Republic-Transcom has issued a water heater manual which presents simplified sizing procedures for the entire commercial water heater field (GEC-860). The 61-page manual is designed so that additional pages may be inserted as they are issued.
Republic-Transcom Industries

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57	58	59	60	61	62	63	64	65	66	67	68	69	70

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GAS DIGEST

28. Two-way radio

General Electric's Bulletin ECR-816 describes the company's table model base station two-way radio (GEC-140). The unit serves as a control center permitting a dispatcher to talk to mobile radios in cars or trucks, shoulder-strap portables, or shirt-pocket message receivers.
General Electric Co.

29. Rotary compressors

Form E-268 describes Davey's complete line of 125-cfm rotary compressors (GEC-010). Contents include 18 illustrations of important compressor design features and an explanation of operating principles.
Davey Compressor Co.

30. Lubricated valves

Eight-page bulletin V-218 Rev. 2 provides complete instructions for lubricating and servicing Rockwell-Nordstrom valves (GEC-820). The three-color bulletin describes by text and step-by-step illustrations the proper method of lubrication, the correct adjustment of valves, etc.
Rockwell Manufacturing Co.

31. Air compressors

Ingersoll-Rand describes its line of Gyro-Flo compressors for general utility services in Bulletin 2938 (GEC-010). Three types of compressors — power take-off, truck-mounted, and wheeled units—are described.
Ingersoll-Rand Co.

32. Pressure regulator

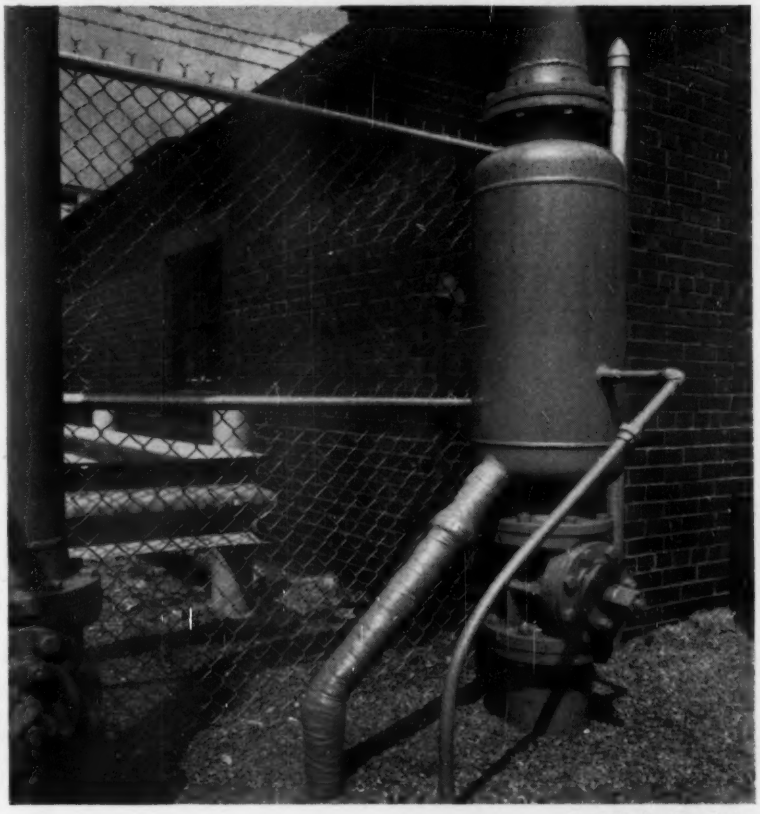
Reliance Type A-163 pressure regulator for laboratory test applications is described in Bulletin 113 (GEC-700). With inlet pressures up to 1 psi, it can be adjusted for outlet pressures ranging from 3.2 to 16 in. w.c.
American Meter Co.

33. Gas engines

White Diesel has published bulletins on its medium speed, heavy-duty, balanced opposed compressors (GEC-160). Bulletin 124 describes the 200- to 1000-bhp units for gas gathering, gas lifting, repressuring, and booster service.
White Diesel Engine Div.

Problem

How to Remove Scrubbing Oil ENTRAINMENT from 8" Feeder Main



East Ohio Gas Installation
Ford Motor Co., Forge Plant, Canton, Ohio

Solution

HI-EF GAS LINE SCRUBBER—To eliminate the fouling of gas controls on billet reheating furnaces, a Type L8-150 Hi-eF Gas Line Scrubber was installed in 8" feeder main. This one Hi-eF Scrubber replaced a combination of baffle-type scrubber and a filter operating in series.

Results

Handling 5 to 6 MMSCFD of natural gas at 60 PSIG, Hi-eF, with no moving parts or messy screens, removed approximately 30 gals. of liquid entrainment per week.

More Information

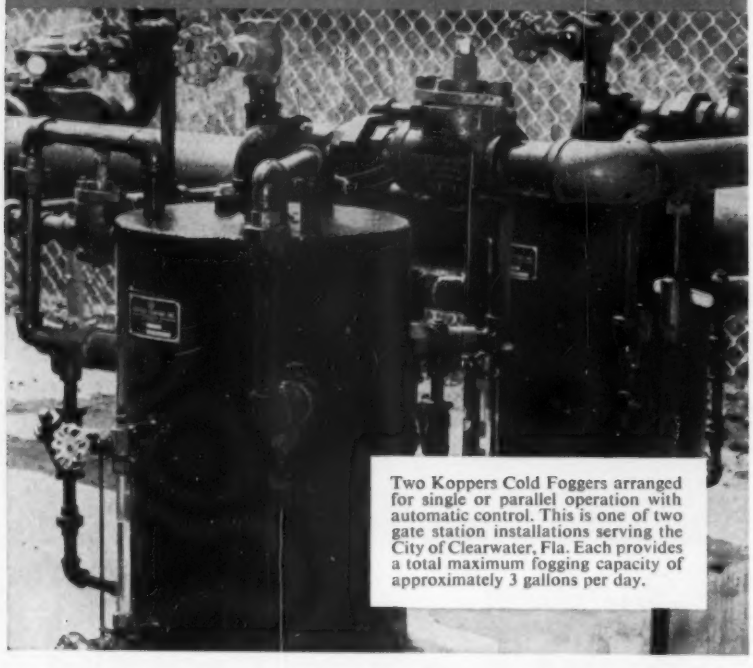
Write for Bulletin 601 containing data on 7 types of scrubbers, purifiers, separators and mist extractors or ask for an Anderson Engineer to call.

Hi-eF PURIFIER

By the Manufacturers of Super-Silvertop Steam Traps

THE V.D. ANDERSON COMPANY
Division of International Basic Economy Corporation
1981 West 96th Street Cleveland 2, Ohio

OIL FOG



Two Koppers Cold Foggers arranged for single or parallel operation with automatic control. This is one of two gate station installations serving the City of Clearwater, Fla. Each provides a total maximum fogging capacity of approximately 3 gallons per day.

to protect gas distribution systems, reduce "unaccounted for" and control dust problems

By introducing a fine oil fog into gas mains, Koppers Oil Foggers reduce maintenance of meters and regulators, condition main joints, minimize leakage, control dust problems and reduce service calls.

Koppers Cold Foggers are available as stock items in capacities as low as 1 gallon per day. Hot Oil Foggers for gas, steam or electric heating, are made in a wide range of capacities, as much as 200 gallons per day. For full information write to: KOPPERS COMPANY, INC., Gas Apparatus Dept., 2001 Scott St., Baltimore 3, Md.

KOPPERS

GAS APPARATUS

Designers and builders of gas holders and gas plant equipment for more than 80 years

Inspection, repair and service of gas holders

GAS DIGEST

34. Thermostats

A four-page, full-color folder offers complete information about White-Rodgers' contemporary-styled series of room thermostats (GEC-190).
White-Rodgers Co.

35. Performance rating

American-Standard has available a performance rating chart, a method of evaluating just how much hot water a particular family uses (GEC-860). The chart uses a point system for factors such as dishwashing, laundry, size of family, number of pre-school children, size of home, and number of bathrooms.
American-Standard

36. Regulators

A newly revised 12-page bulletin describes the complete line of Rockwell "1001" regulators (GEC-700). Bulletin 1059-Rev. 4 describes the 1001 as providing accurate control for installations requiring both large and small flow rates where supply pressures ranging up to 200 psi must be reduced to 60 psi or less.
Rockwell Manufacturing Co.

37. Air compressors

Illustrated Bulletin 203 from Clark Bros. introduces the C-line of packaged air compressors for industrial applications (GEC-010). The line includes four models rated at 25, 50, 75, and 100 hp.
Clark Bros. Co.

38. Gas dryers

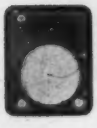
Speedy Therm's latest promotional publication tells the story of gas dryers in comic strip format (GEC-120).
Speedy Therm

39. Almanac

Manpower Inc. has published an old-fashioned businessman's almanac and vacation calendar (GEC-450). In addition to the standard calendar which has space for appointments, there are sections on the use of office equipment and supplies; the moving, shipping and storage of items; and a section on maintaining efficiency during an office emergency.
Manpower Inc.

BUILD ECONOMY INTO YOUR SYSTEM, with American® Equipment!

If you're already using American measurement and control equipment on your system — large or small — you know how it reduces manpower requirements and provides continuous operating economies. If you're not already saving with American equipment, ask your representative for full information. You'll be surprised to learn how little it costs to build sustained accuracy, dependability and long-term operating economies into your system.



TELEMETERING SYSTEMS — Designed to meet the individual requirements of any system.

CONTROLLERS — Series A-88 Controllers, Transmitters and Receivers for measurement and control of continuous process variables.

ORIFICE METERS — Dri-flo and mercury manometers in recording, indicating and integrating models — in a variety of working pressures and differential ranges.

CANNON PENS — Record up to a year without refilling — produce charts of maximum legibility — no blurring or smearing.

RELIANCE REGULATORS — For industrial, commercial and house service applications.

AMERICAN METER CO. EST. 1836

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INCORPORATED (ESTABLISHED 1836)

GEM GAS EQUIPMENT MANUFACTURERS GROUP MEMBER

GENERAL SALES OFFICE: Philadelphia 16, Penna. • Albany • Alhambra • Atlanta • Baltimore • Birmingham • Boston • Chicago • Dallas • Denver • Erie • Houston • Kansas City Los Angeles • Minneapolis • New York • Omaha • Pittsburgh • San Francisco • Seattle • Tulsa • Wynnewood

IN CANADA: Canadian Meter Company, Ltd., Milton, Ontario • Calgary • Edmonton • Montreal • Regina • Vancouver

SUPPLIERS TO THE GAS INDUSTRY for Ironcase, Tinned Steelcase, Aluminumcase, and Welded Steelcase Meters • American-Westcott Orifice Meters • Instruments • Reliance Regulators • Apparatus • Valves

SAVE MONEY

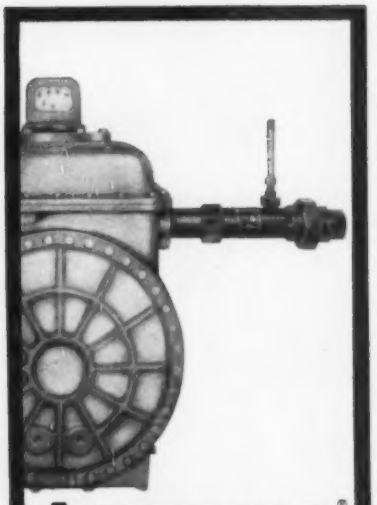
no meter set and removal expenses

SAVE TIME

on-the-spot proof testing

SAVE EFFORT

no hauling meters to shop



AMERICAN®

FLOW PROVERS

Light weight and portable. Quick, accurate, in-the-field proof testing of high capacity positive displacement meters.

AMERICAN LOW PRESSURE FLOW PROVERS for testing meters with air or gas at pressures below 15 psi. Calibrated orifice discs for capacities ranging from 100 to 10,000 cfh.

AMERICAN CRITICAL FLOW PROVERS for testing high pressure displacement meters. 1000 psi maximum working pressure. Available in 2-inch size with gas capacities from 250 to 6000 cfh.

AMERICAN®
METER COMPANY

General Offices: Philadelphia 16, Pa.
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NFPA says gas has good record

Gas and gas appliances were blamed for only 3.5 per cent of all building fires in the U.S. during 1959, causing only 31,600 out of the total 883,300. Figures come from AGA's summary of NFPA's annual estimates.

In dollars, 1959's building losses were estimated at $1083 million. Gas was charged with 2.6 per cent of these, for an estimated $28.5 million.

Gas-fueled equipment was charged with only 19,800 of the 202,000 fires caused by defective or overheated cooking and heating equipment of all types. Dollar loss for gas was $16.4 million of the $137.8 million total.

Fires charged to gas and gas appliances, including gas explosions, were estimated by NFPA at 11,800 with losses of $12.1 million.

NFPA has reprints of its report available for 25 cents a copy. The address is 60 Batterymarch St., Boston 10.

J. B. Edens (seated), president of Southwest Forest Industries, signs up for delivery of natural gas to Arizona's first paper and pulp mill. Looking on is W. D. James, Arizona district manager for Southern Union Gas Co., which will deliver about 10 MMcfd to the mill being built near Snowflake, Ariz. When the mill begins operations next October, it will be the largest consumer of natural gas in northern Arizona with an initial yearly demand exceeding 3.6 billion cu ft. Southern Union and El Paso Natural Gas Co. jointly are investing $1.3 million in facilities to supply the mill.

AL-250

ALUMINUMCASE METER

1. SLOW-SPEED OPERATION
2. SUSTAINED ACCURACY
3. LIGHT WEIGHT

- American® AL-250 Aluminumcase Meters operate at only 7 revolutions per cubic foot providing ample power, greater accuracy and longer life.
- Molded, 3-convolution Duramic diaphragms for all fuel gas services.
- Light weight, high impact strength, die-cast aluminum alloy body reduces shipping, handling and setting costs.
- Easy reading vented index box for full index visibility.
- Rated capacity 250 cfh of 0.60 sp. gr. gas at ½-inch w.c. differential — 5 psi working pressure.

AMERICAN®
METER COMPANY
INCORPORATED (ESTABLISHED 1836)

General Offices: Philadelphia 16, Pa.
Sales offices in principal cities.

Late News Flash

As we went to press, the individuals who later became the incorporators, officers and directors of International Gas Co. (see p. 98-100) dropped by GAS' office. They told us they have been working with the Mexican authorities for about five years.

Suggested plan is to buy surplus gas in Mexico's Reynosa field, and in recently discovered fields west of Reynosa. They will build a line across central Mexico, ending at the California border, probably at Mexicali. There the gas will be sold solely for generating electric power, thus providing an uninterruptible supply.

International has been assured by Mexican authorities that there is available sufficient reserves to justify construction of the line and southern California generators of electric power also assure International of the need now and in the future for this uninterruptible supply.

The proposed line will make gas available to a number of Mexican cities in addition to delivering up to 500 Mmcfd at the California border. A proposal to effectuate this plan was submitted by International to Pemex and the Mexican government, and the plan has been discussed with governors of all the states through which the line will pass.

Officers and directors of International Gas are:

Chairman, Thomas W. Evans; President, Clyde C. Dawson, Sr.; Vice President, Dr. E. H. A. Andrews (all of Beverly Hills, Calif.); and Dan Cameron and Miles Carmichael, both of Tulsa, directors.

Dealers join gasco in promotion

Sixty-five heating equipment dealers in eastern North Carolina joined in the first annual heating equipment sales promotion sponsored by North Carolina Natural Gas Corp.

The system-wide contest was planned by J. P. Crowley, vice president, sales, of the Fayetteville-based company. It was designed to aid dealers, distributors and manufacturers in taking advantage of new markets opened up by the arrival of natural gas.

North Carolina Natural introduced natural gas into the area in 1959 and serves 31 communities in the eastern part of the state.

CUT 20" CAST IRON PIPE
in Less Than 8 Minutes...

...with the New REED
ROTARY CUTTERS

[4 sizes cover the range from 10" cast iron to 24" steel pipe]

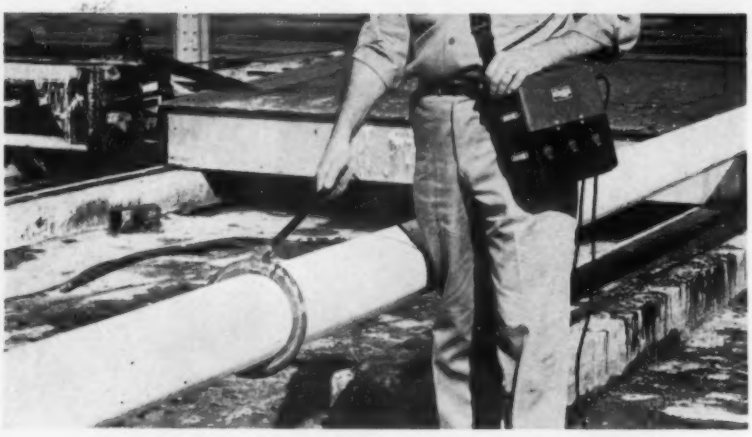
These one-man Reed Rotary Cutters cut large diameter steel or cast iron pipe *faster and better than the heaviest power machines* . . . and without electrical or explosive hazards. What's more, there's less digging in ditch-work! You need only a 4" to 6" channel under the pipe and a 45° to 60° arc for the handle swing. Reed Rotaries are easy to "carry in", too. The 20" size weighs only 68 pounds; separates into 3 easily carried parts. Patented pipe guide assures clean, right-angle cuts. Four razor blade wheels track perfectly, cut easily and are quickly interchangeable for steel or cast iron pipe.

● Write today for descriptive literature.

These typical cuts on 12, 16, 20 and 24" cast iron pipe illustrate the clean, accurate, right-angle cuts provided by Reed Rotary Cutters.

REED
REED MANUFACTURING COMPANY
ERIE • PENNSYLVANIA

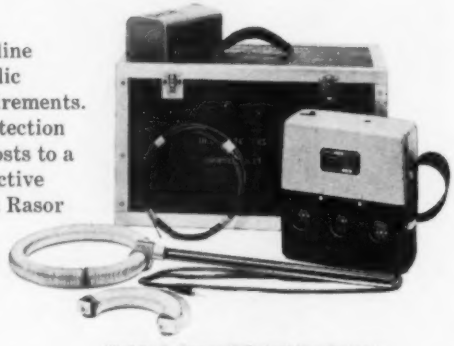
INSPECTION IS THE KEY TO GOOD PIPE COATING



TINKER & RASOR HOLIDAY DETECTORS

insure coating continuity

Every void in your pipeline coating increases cathodic protection current requirements. To obtain maximum protection and hold maintenance costs to a minimum, inspect protective coating with a Tinker & Rasor Holiday Detector and make repairs before backfilling.



Tinker & Rasor E P Holiday Detector.
Portable, "damp-climate" pulse type.

Write for your free Data Kit.

Tinker & Rasor has prepared a complete data kit of descriptive material and recommended procedures for inspecting protective coatings. Material includes technical data on equipment, recommended inspection procedures, general discussion of types of detectors, theory of operation, etc.

ENGINEERING NOTE:
To insure a perfect application, include Tinker & Rasor Holiday Inspection. Write for specification guide.

Quality Control for Coating Application

TINKER & RASOR

417 Agostino Road, P.O. Box 281 • San Gabriel, California

Greco to head NACE this year

Officers for the National Association of Corrosion Engineers have been elected for 1961-62. They will be installed March 17, the last day of the association's 17th annual conference and corrosion show at Buffalo, N. Y.

E. C. Greco, senior research chemist for United Gas Corp., Shreveport, was elected president. Rolland McFarland, secretary and technical director of Hills-McCanna Co., Chicago, was named vice president, and C. G. Gribble, Jr., district manager for the Metal Goods Corp., Houston, was re-elected treasurer.

Three directors also were elected. They are: Frank E. Kulman, senior engineer, Consolidated Edison Co. of New York; L. W. Gleekman, supervisor of the materials engineering group, engineering department, Wyandotte (Mich.) Chemicals Corp.; and Fred D. Stull, superintendent of corrosion prevention, Texas Gas Transmission Corp., Owensboro, Ky.

Data processing advances announced

Thin-film computer memory, a major scientific breakthrough, heads a list of five new data processing advances announced by Remington Rand Univac division.

"The development of a thin magnetic film memory capable of performance outside of the laboratory, until this time, has eluded computer manufacturers," declared Dause L. Bibby, Remington Rand president. "The Univac breakthrough now makes possible a whole new generation of computers that operate in nanoseconds, billionths instead of millionths of a second."

First computer to employ thin-film memory, the Univac 1107 Thin-Film memory computer, was among the new products announced. Another is the Univac 490 real-time system. This communications-computer network system provides instantaneous inventory and production control to companies with widely scattered operations.

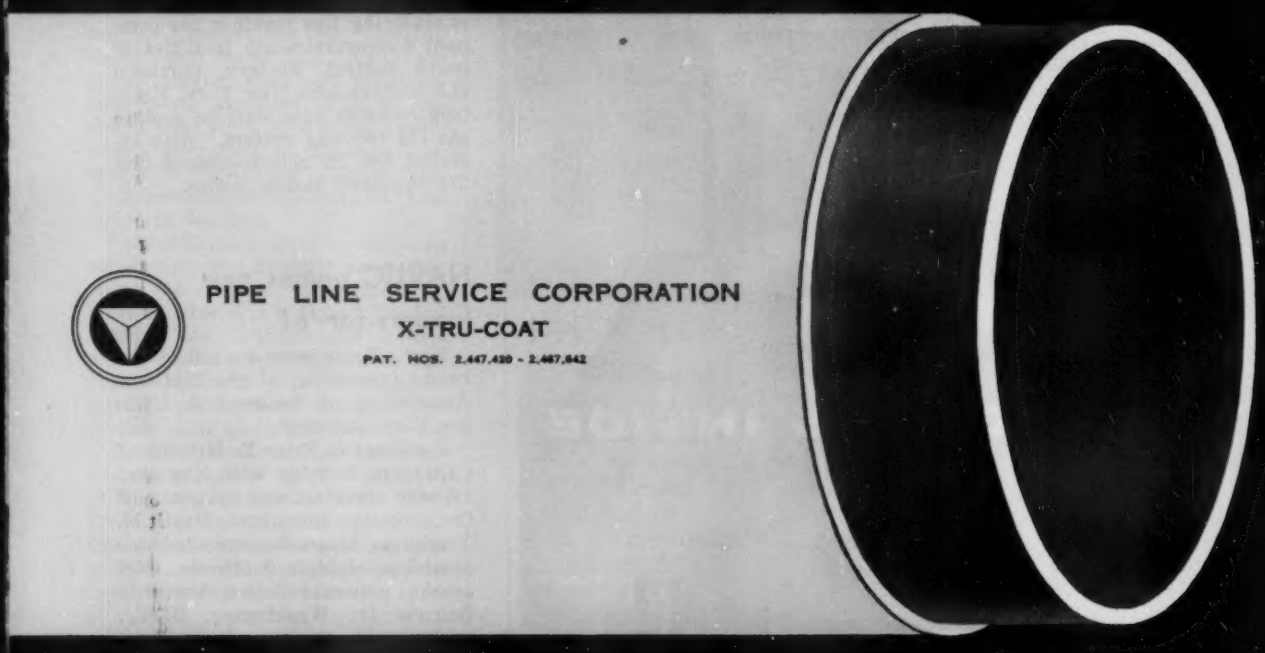
Also announced was the military version of the 490.

Remington Rand also plans to provide COBOL (common business oriented language) automatic compiler systems for use with its computers.

PIPE LINE SERVICE CORPORATION

now offers

X-TRU-COAT



Contributing once again to the progress of the Gas and Oil Industry, Pipe Line Service Corporation, pioneer in the field of steel pipe protection, offers you the application of X-TRU-COAT.

X-TRU-COAT is a High Density Polyethylene extruded on steel pipe over a pressure sensitive adhesive, produced under the Dekoron process.

Pipe Line Service is the first Independent Coating Company to apply X-TRU-COAT, and is now offering *Immediate, Unlimited Production* at our Sparrows Point, Maryland plant on pipe sizes ½" through 4½" O.D. pipe. X-TRU-COAT will soon be available at our new Youngstown, Ohio plant (presently under construction) in early Spring, 1961.

For prices and complete information about this new service, call or write Pipe Line Service Corporation, P.O. Box 318, Franklin Park, Illinois.

Pipe Line Service Corporation

A SUBSIDIARY OF AMERICAN STEEL FOUNDRIES

General Offices and Plant: Franklin Park, Ill.

Quality pioneers in coating and wrapping pipe for over a quarter century

2-way radio links territory

New York State Electric & Gas Corp.'s territory has been tied together by a new two-way mobile radio network.

Under a long-term contract totaling $816,000, representatives of General Electric's communications products department installed a transistorized mobile system—said to be one of the largest of its type in the nation. GE will provide complete installation and maintenance of the two-way system for the next 10 years.

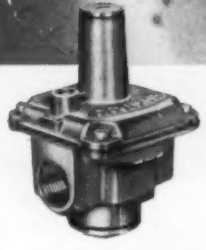
A comprehensive plan of system engineering ties together the company's communication facilities in south central, western, northern and southeastern New York. Eighteen two-way base stations replace the old two-way system. Also installed are 29 remote-control and 310 low-band mobile radios.

Over 10,000 persons saw two all-gas homes in Saginaw, Mich. recently when Consumers Power Co., cooperating with 33 building suppliers and the builder, promoted a "Better Homes & Gardens (Blue Star) Idea Home" (shown here) and an all-gas "Mrs. America Home" next door.

Only in rotating wear surfaces are you likely to find the high precision and smooth commercial finishes that exist in the valve assembly of a Straight-Thru-Flow Regulator.

You're looking at the regulator outlet side at the conical valve, as it moves up toward the conical seat. Angular tolerances in both of these parts are held to 15 minutes for a possible cumulative mismatch of only .003".

Such precision results in flat line pressure drop characteristics and accurate, predictable performance which exceeds all other regulator designs. And, it's the reason why Maxitrol Straight-Thru-Flow is found on the finest manifolds. How about yours?



NO REGULATOR PERFORMS QUITE LIKE A MAXITROL

MAXITROL COMPANY
23555 Telegraph Road Southfield, Michigan

NARUC names new leaders for '61

New officers were elected at the recent convention of the National Association of Railroad & Utilities Commissioners.

President is Peter E. Mitchell of California. Serving with him are: 1st vice president and chairman of the executive committee, David M. Brackman, Massachusetts; 2nd vice president, Joseph J. Brown, Nebraska; general solicitor, Austin L. Roberts Jr., Washington, D. C.; secretary-treasurer and assistant general solicitor, Everette Kreeger, Washington, D. C.

Open house at OFG

Ohio Fuel Gas Co. held open house recently at its new district headquarters building in Cambridge, Ohio.

The flat-roofed structure is of one-floor design with a full basement, providing 9160 sq ft of floor space.

All-gas equipment includes four Arkla-Servel units for year-around air conditioning, a commercial-size incinerator, and a large water heater serving the entire building. A basement utility room contains a home-size gas range and refrigerator. Gas lamps are used for outside lighting.

ONG honors safety director

Oklahoma Natural Gas Co.'s first operating department award went to W. Vance Smith, safety director for the Tulsa-based company. P. K. Wallace, vice president in charge of operations, said the award will go annually to an operating employee.

The tribute called attention to the safety record achieved by Oklahoma Natural last year—the best in its 53-year history.

Oklahoma Natural's safety program has grown up under Smith's leadership.

Today there is a safety man for every 285 workers. They make regular inspections of working habits and conditions. And they stage regular meetings to stress safer work practices. Part of the safety man's job is to guide supervisory personnel in localized programs. "On-the-job" safety sessions are held by foremen and their crews in the field.

To stimulate a drive to cut down accidents, management cooperated with the safety department to start a President's Safety Trophy contest. As districts and departments reach safety milestones and earn Southern Gas Association awards, management rewards employees with steak dinners.

Recently, Smith's department began printing a special page in ONG's employee magazine. "Life Lines," as the page is called, recognizes worthy efforts among employees in helping improve the company's safety record.

Mich. Con rate hike not enough

Michigan's PSC granted a $7.5 million rate increase to Michigan Consolidated Gas Co., which said the increase was less than half the requested amount.

Executive vice president Hugh C. Daly said "the increase . . . not only does not allow any higher earnings on our common stock, but is expected to result in a somewhat lower return to our investors."

The boost limits Mich Con's rate of return to 6.66 per cent on its investment. The company said it should earn a 7.5 per cent return.

Rejected by the commission were most of the Detroit company's claims that higher operating costs should be considered in the rate hike.

2 New
RIDGID
Tubing Cutters
Give you Grooved Rollers for close flare cut-offs... no waste! Also, Enclosed Feed Mechanism • Spare Cutter Wheel in Handle •
Fold-in Reamer

RIDGID No. 205 Tubing Cutter

Time-Saving, Slide-to-Size ⅛" to 2⅝" O.D. Capacity

Made of lightweight, high-strength cast aluminum alloy, you'll find these new RIDGID Tubing Cutters extra handy. Slight push on handle of large-size-range RIDGID No. 205 snugs cutter wheel against tubing . . . locks it in position until released. Feed screw fully protected and enclosed . . . always feeds into tube with easy handle turn . . . can't jam with chips or dirt. Wheel gives quick, clean cuts of copper, brass, aluminum tubing and thin-wall conduit . . . no burr. Grooved rollers give easy flare cut-offs without tubing waste. Tubing always turns freely on 2 of 4 Rollers. Rollers smooth tubing ready for soldering. Fold-in reamer always handy. Spare cutter wheel in handle. Wheel for plastic and aluminum pipe available for No. 205 only.

Conform to Fed. Spec. GGG-C-771b Type II—Class I—enclosed feed mechanism

RIDGID No. 105 Tubing Cutter

Protected Feed Screw
Always Easy-Turning
⅛" to 1⅛" O.D. Capacity

To save time and tubing, order these new RIDGID Tubing Cutters today!
Your Supply House has them!

RIDGID
The Ridge Tool Company, Elyria, Ohio, U.S.A.

HAYS®

all Brass
GAS STOPS
for...

METER SETTINGS
Flat Head • With or Less Check
Lock Wing

SERVICE LINES
Low, Medium and High Pressure

INDUSTRIAL USE
Three-Way • Graduated Dial

APPLIANCES AND EQUIPMENT
Lever Handle • Square Head
Flat Head
A.G.A. Listed Control Valves

GENERAL PRODUCTS DIVISION
HAYS MFG. CO.
ERIE, PA.

Court fight looms for AGA's Blue Star program

AGA's Blue Star program has run into trouble in the courts. On Jan. 16, the U. S. Supreme Court ordered a Chicago federal court to try a treble damage suit against AGA, six manufacturers, two pipelines, and two distributors for restraint of trade. Suit was brought by Radiant Burners Inc., Lombard, Ill.

Radiant sued AGA and the others alleging that they had conspired to restrain trade in the manufacture, sale, use, and installation of gas burners. Radiant makes gas furnaces. It said that the American Gas Association maintained laboratories in Cleveland and Los Angeles to test such equipment, and grants a seal of approval if certain requirements are met. It alleged that AGA arbitrarily withheld its seal from Radiant products, and that the distributors advised householders not to buy them and even refused to supply gas for them.

Lower courts threw out the suit. But, the Supreme Court ordered the case to be heard, ruling that the charges constitute a type of restraint forbidden by the Sherman Antitrust Act. As a "friend of the court," the Justice Department's antitrust division urged that the charges be heard by the lower court.

Other defendants were Crown Stove Works, Florence Stove Co., Sellers Engineering Co., Gas Appliance Service Co., Autogas Corp., Norge Sales Corp., Natural Gas Pipeline Co. of America, Texas-Illinois Natural Gas Pipeline Co., Peoples Gas Light & Coke Co., and Northern Illinois Gas Co.

Northern building extraction plant

Northern Natural Gas Co.'s newest subsidiary, Northern Gas Products Co., is building a propane extraction plant at Bushton, Kan.

The project includes an extraction plant, estimated to cost over $9 million, and liquid salt cavern storage facilities.

P. A. Gass, a senior vice president of the parent company and recently named president of the newly formed Northern Propane Gas Co., is president of the newest company.

Gass said the plant, capable of processing 900 MMcfd, "is believed to be one of the largest facilities of its kind."

A LEAK IN THE DIKE

Southern Cross Foresters, like the little Dutch boy, keeps "its finger in the dike" for the gas distribution industry. Like a leak in the dike, without attention unaccounted for grows and grows. Our "Contract Leakage Control Service," both survey and repair, can supply expert help as you need it . . . when you need it. without costly build-up of personnel and equipment. For complete information about SCF Leakage Control Service, call collect.

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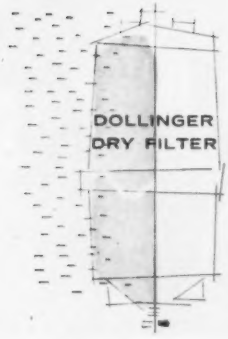
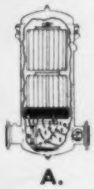


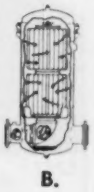
Dollinger Staynew Gas Filters, such as the one here in a district regulator vault, are available in single units to 300,000 SCFH capacities, multiple units for larger capacities.

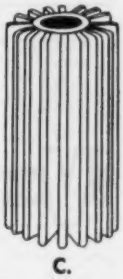
HELP ELIMINATE DAMAGED VALVES, CLOGGED PILOTS

Dollinger Staynew Gas Filters remove dry oxide, sticky oil deposits, and other foreign matter from natural gas lines at district regulator stations, industrial and power plants, and large meter or control stations. On manufactured gas lines, Staynew Gas Filters effectively stop lamp black and moisture from entering district regulators and pilots.


A.

Assure more efficient filtration. Staynew Gas Filters employ a unique double action principle that cleans gas by two processes. MECHANICAL SEPARATION (A) directs the flow of gas into the base at high velocity, where water, oil and heavier particles of rust, scale and dirt are deposited. Then the gas, having been mechanically cleaned, is FILTERED through the Radial Fin insert at low velocity (B) removing any remaining particles. The Radial Fin construction (C) is unequalled as an efficient form of pipe line filtration. It offers the largest possible active filtering area for the space it occupies—this means high efficiency at low resistance without constant servicing.


B.


C.

Accessible and flexible construction. Interior parts of Staynew Gas Filters are easily exposed for inspection and cleaning. Loosening of swing bolts allows removal of the housing without breaking pipe connections. Inlet and outlet connections of Staynew Gas Filters may be varied to suit individual installation requirements.

If you have a gas filtration problem, consult your local Dollinger representative. He can offer time-saving economical solutions. Or, write for Bulletin 290-R, Dollinger Corporation, 68 Centre Park, Rochester 3, N. Y.

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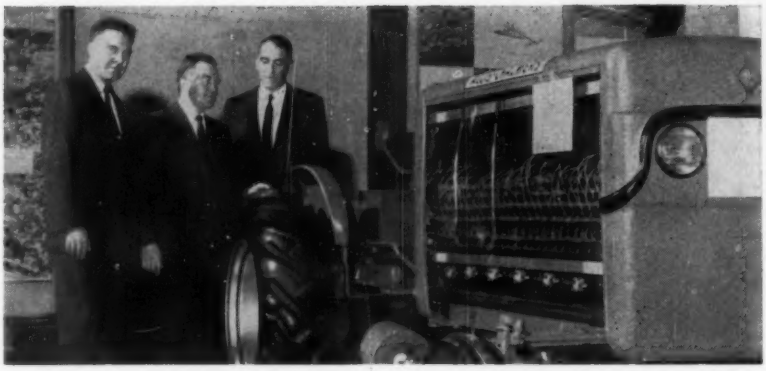

Allis-Chalmers presented the first vehicle powered by self-contained fuel cells to the Smithsonian Institute. At the presentation were (from left): Will Mitchell Jr., acting director of A-C research division; Edward Kendall, an associate curator of the museum; and Frank A. Taylor, director of Smithsonian.

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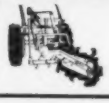
W-3

W-1

3P 

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Corrosion courses scheduled

Four short courses on corrosion are being sponsored or endorsed by the National Association of Corrosion Engineers during the first six months of this year.

First is the Houston Section NACE corrosion short course slated for Feb. 2-3 at the Rice hotel in Houston. Subjects to be covered: corrosion control in transmission pipeline systems, corrosion in gas and oil production, corrosion in refineries and chemical plants, and corrosion in commercial and residential construction.

The annual corrosion short course sponsored by NACE Shreveport section is scheduled for Feb. 14-15 at Centenary College in Shreveport.

The NACE Greater Boston section is planning a three-day short course in corrosion control for June 20-22. Sessions will be held at Wentworth Institute in Boston.

The NACE-endorsed and University of West Virginia-sponsored Appalachian underground corrosion short course will be held June 6-8 at Morgantown, W. Va.

Columbia consolidates

Another step was taken last month by Columbia Gas System in its corporate simplification program. Columbia Gas of Maryland took over the retail gas business in two western Maryland counties served by affiliated Cumberland & Allegheny Gas Co.

Earlier, Columbia had organized Columbia Gas of New York Inc. and Columbia Gas of Kentucky Inc. It's in the process of setting up Columbia Gas of Pennsylvania Inc.

New safety material issued

National Safety Council is offering several items of interest to the safety-minded.

"The Big Payoff" is a publication aimed at selling employees on the value of their companies' accident prevention program. It is a 12-page, straight-from-the-shoulder talk about how employees benefit from taking an active part in a safety program.

"Seat Belts Save Lives" is an 8-page illustrated booklet giving factual data on how seat belts lessen injuries and reduce the possibility of death in auto accidents.

The third item is an effective, low-cost safety training course for industrial foremen.

Written by training-expert Glenn Griffin of the University of Michigan's Bureau of Industrial Relations, the course consists of a series of six text booklets entitled "Men and Motives in Safety Supervision," and a manual for discussion-group leaders.

Additional information is available from the National Safety Council, 425 N. Michigan Ave., Chicago 11.

A flare heralds the arrival of natural gas in three communities in the metropolitan area of Indianapolis. Indiana Gas & Water Co. laid the 11.5-mile, 8-in. line in less than eight weeks. When the distribution systems are completed later this year, total investment will exceed $2 million. Taking part in the ceremony are (from left): Greenwood (Ind.) Mayor Ralph Burkhart, City Councilman Robert Terhune, Indiana Gas president J. W. Heiney, vice president Fred W. Dopke, and district manager R. S. Baker.

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GREATER METER ACCURACY

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Co-ops, utilities square off

Cooperatives and public utilities squared off recently in Illinois. The fight looms over a proposal by utilities that three southern Illinois electric co-ops be declared public utilities.

The three co-ops plan to build a generating plant near Marion and operate it through Southern Illinois Power Co. Fighting the plan are Illinois Power Co. and Central Illinois Public Service Co.

In their complaint, the power companies charge that the co-ops "have obviously been operating as public utilities and now intend to invade the territory being served by public utilities which are subject to the commission's jurisdiction."

Vermont needs gas supply

Vermont is looking for a gas supply to help industrial development of the state.

An advisory committee appointed by the governor has been studying the feasibility of piping natural gas into the state—the only state, along with Maine, lacking natural gas.

The committee recommended that a comprehensive report on natural gas be prepared and interested Vermont gas companies be invited to participate in obtaining the report.

New England, the committee pointed out, has been and still is a relatively high price coal and oil area, with costs about 50 per cent higher than the national average.

"It is a matter of knowledge," the committee said, "the introduction of natural gas into a locality has spurred industrial activity."

Pressure vessel guide issued

"Unfired Pressure Vessels," a revised guide to the ASME Boiler and Pressure Vessel Code, was published late in 1960. Intended for those who must occasionally consult the complex code, it is the fourth edition of the book previously called "The Unfired Pressure Vessel Code Simplified." (Preceding editions came out in 1955, 1957, and 1959.)

This 154-page, hardbound book is available from F. W. Dodge Corp., 119 W. 40th St., New York 18, for $8.75.

GAS • News Notes

Northern Illinois Gas Co. is offering a full-tuition scholarship for four years' study at Illinois Institute of Technology. The scholarship is for the Gas Technology option in chemical or mechanical engineering at IIT.

Hill Hubbell Co. has a licensing agreement with Republic Steel Corp. to market the latter's X-Tru-Coat plastic-coated pipe. To handle the new process, along with its bituminous pipe protection operation, Hill Hubbell will expand three of its plants—Youngstown and Lorain, Ohio, and Hammond, Ind.

Northwest Natural Gas Co. has a $2 million remodeling and building program under way in Portland, Ore. Head offices will be moved to new quarters and a building will be remodeled to house the general staff, operating offices, and engineering department. Also planned is an $800,000 service center.

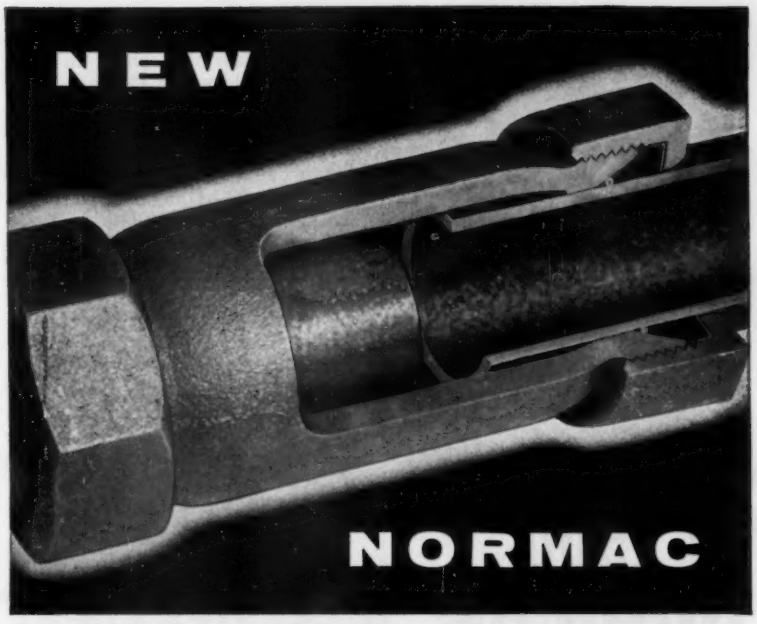
Oklahoma Natural Gas Co., Tulsa, wants to buy State Fuel Supply Co. of Oklahoma City. State Fuel serves 12,500 gas customers in 16 Oklahoma cities.

Alabama's PSC gave Alabama Gas Corp. a $2.6 million rate boost and pointed an accusing finger at FPC at the same time. The utility's rate hike stems from an FPC approved rate increase for Southern Natural Gas Co. Rates are "primarily being regulated and fixed by actions of FPC," asserted Alabama PSC.

Northern Indiana Public Service Co., Hammond, wants to provide gas service in rural areas of 14 counties in the northern third of the state. In its PSC filing, NIPSCO said new transmission and distribution facilities to serve the 2400 additonal rural cutomers will cost nearly $1.25 million.

More effective use of secondary air in a gas burner application is covered in a new research bulletin from the AGA Labs. Additional information or copies of the bulletin ($2 each) are available from the Labs, 1032 E. 62nd St. Cleveland 3.

Mountain Fuel Supply Co., Salt Lake City, is listing its capital stock on the New York Stock Exchange. Trading was expected to begin early in January.



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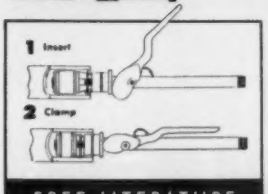
You can save 40 minutes per pipe section tested



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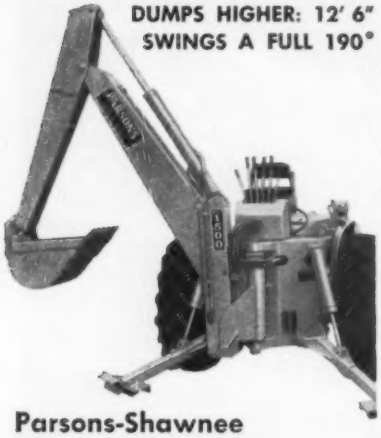

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Handles all excavating jobs easily . . . including straight down spot digging. Sizes from 16" to 36" widths.

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Construction gets under way this month on Arizona Public Service Co.'s new service center in Deer Valley, northwest of Phoenix. Most of the company's gas and electric shops and garage and warehouse facilities, now located near the company's general office building in Phoenix, will be housed in the new center.

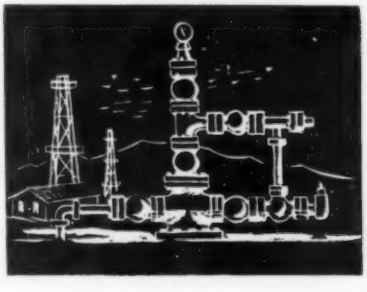
John J. Nesbitt Inc., Philadelphia-based manufacturer of heating, ventilating and air conditioning equipment, plans to acquire Norman Products Co., Columbus, Ohio. Norman produces a similar line of gas-fired equipment. Norman Products will continue under its same management as a division of Nesbitt, with Edward A. Norman continuing as president.

Southern Gas Association has discontinued the 15-year-old short course in gas technology offered each spring at Texas A&I College.

Texas Tractor Co., Tyler, Texas, is distributor for Allis-Chalmers Manufacturing Co.'s Construction Machinery division in 37 east Texas counties.

Dixie Products Inc. has consolidated its divisions under the corporate name, Magic Chef Inc. Dixie and Magic Chef have been operating as separate companies, each with its own line of products, plants, and marketing organizations, under one board of directors. Now, a single organization will produce and market all appliances under the trade name, Magic Chef.

Caloric International, S. A., overseas arm of Caloric Appliance Corp., has signed a long-term licensing agreement with Kanto Gas Appliance Co. Ltd. of Tokyo. Under the agreement, American-style gas appliances, designed and engineered in the U. S. but built in Tokyo, will be available to homemakers in Japan and other Far East countries.



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Engineering degree preferred with at least two (2) years experience in the industrial, commercial and central house heating, air-conditioning and miscellaneous appliances, covering gas sales, engineering, supervisory installation and service.

Must be thoroughly experienced in preparing heating and air-conditioning surveys and selling gas equipment for the promotion of gas sales.

Starting salary, $520 ranging to $630 per month. Maximum age—35.

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GAS DISTRIBUTION ENGINEERS

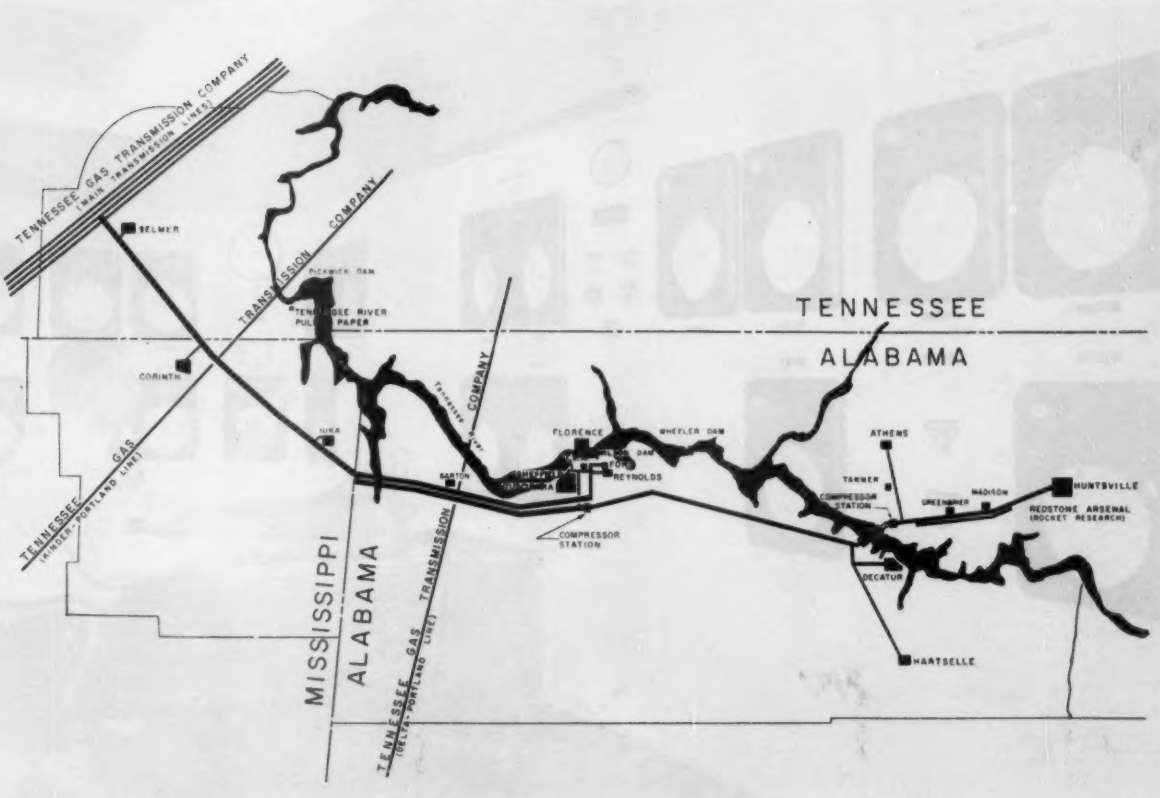
Engineers experienced in all phases of the engineering and installation of gas distribution systems for cities and towns, including feasibility studies, design, preparation of specifications, field location, and supervision of construction, inspection, testing, conversion and start-up. Openings for Project Manager and Project Engineers. Salary commensurate with experience. Send summary of experience and education.

BOX 1625, GAS MAGAZINE
198 S. Alvarado St., Los Angeles 57, Calif.

GAS

PIPELINE SECTION

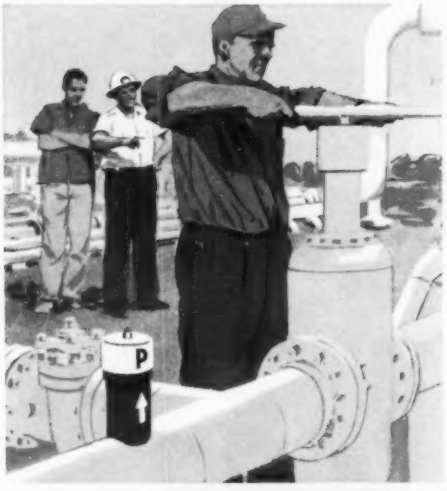
SUPERVISORY CONTROL SYSTEM

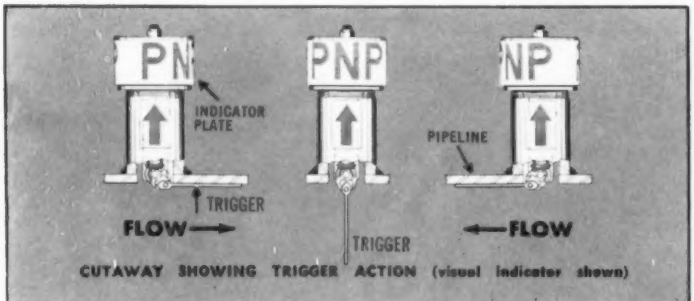


PACES BOOMING MARKET

NEWS FROM DOWN THE LINE!

Successful PIG-SIG II
now has NEW BI-DIRECTIONAL TRIGGER
Plus Other Optional Features





• The WmSon PIG-SIG II Scraper Passage Indicator which has earned such wide acceptance in the pipeline industry is now available with bi-directional trigger as an optional feature. The trigger is designed for use in lines where scraper travel may be in either direction and in meter proving loops. Other optional features: pneumatic control with automatic reset and automatic counter to record scraper passage.

Long trigger action detects scrapers even in oversize pipe

In the top example, PIG-SIG II with visual indicator shows the station operator the pig has arrived. He doesn't need to wait and listen at the scraper trap. The next example shows how PIG-SIG II with electric indicator can signal arrival of pig to pump station operator. It can start operation of automatic equipment to open and close valves. PIG-SIG II is easily installed under pressure with WmSon-Hillco Tapping Machines. It is available with visual indicator and manual reset; electrical or pneumatic signal with automatic reset; extended or regular.

PIG-SIG II PATENT PENDING

T.D. Williamson, Inc.

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REPRESENTATIVES AROUND THE WORLD

PIG-SIG II can be used to actuate pneumatic and electric control systems. WmSon engineers may be able to offer dollar saving tips on its use in such systems. **Contact your representative or the Tulsa office.**

Alabama-Tennessee Natural Gas Co. uses

Supervisory control system

to keep pace with unprecedented growth

By GUY FRANKS

AS every parent knows, kids outgrow their clothes fast. They need new outfits all too often.

In its first 10 years, Alabama-Tennessee Natural Gas Co. has outgrown nearly everything it began with—as inevitably as any 10-year-old kid.

This gas pipeline company lies in the heart of an industrial boom area along the Tennessee river in northern Alabama, an area which has been bursting its seams in the past decade.

With birth and expansion of industrial plants, there has been an accompanying influx of manpower to make a variety of chemicals, automotive parts, and ballistic missiles.

Homes, and more homes, for these men and their families put a big demand on local gas systems, primarily for space heating.

No wonder that Alabama-Tennessee, supplying natural gas for this area, has grown at an average rate of 10 per cent every year since we began operations in 1950. The fact is, in its tenth year, our company has reached new highs in sales, earnings and dividends.

We are witnessing growth in demand for natural gas quite beyond our most optimistic dreams and hopes when we established the company just after World War II.

Growth like this is difficult to anticipate and would be difficult to keep track of—without an instantaneous, monitoring system. It has been a steady expansion, fortunately. *But such growth—without telemetering—would mean additional operational problems.*

"We know what's happening in the system immediately," says Ralph Sturges, our measurement superintendent, "otherwise, just a little trouble on the line could cause us costly delays in trying to find it."

"Our pipeline system and meter stations undergo considerable reconstruction each summer, and remote measurement and control instrumentation has been added to provide instantaneous knowledge of conditions of the system at one central point."

"Without telemetering," says Sturges, "we'd never be able to provide the reliable service required by this expanding industrial and residential region."

There can also be crises, as when an unusual cold spell hit the Huntsville, Ala. area, which is located on the end of our line, in March 1960. The temperature dipped to 9 deg F and averaged 18 deg for 24 hours. We packed our line, in anticipation of the morning load, from the dispatching office in Sheffield. During the night, there was little sleep by our supervisory personnel, and as the load increased our line pressure at Huntsville dropped rapidly—from 365 to 76 lb—but no less—thanks to instantaneous pressure and flow information provided by telemetering and our ability to control our system from this information. Years ago it would have been necessary to maintain an operator or to send a measurement man to each of our critical areas to gather pressure data and report by telephone or radio to the dispatching office.

• Operations began in 1950 . . .

Alabama-Tennessee Natural Gas Co. filed application with the Federal Power Commission in 1947, originally contracting to buy 30,179 Mcf of gas per day, tapping off the mainline of Tennessee Gas Transmission Co.,

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Mr. Franks is manager of sales for Alabama-Tennessee Natural Gas Co., Sheffield, Ala.

With ever-increasing demand, fast growing, 10-year-old Alabama-Tennessee relies on instrumentation to operate intelligently, save money, and make steady profit. Here, the dispatcher at the control panel in Sheffield checks the system.

near Selmer, Tenn. Application was made on the basis of city gate sales to 15 localities.

Little did we realize how fast the operation would grow! We had no hint that Ford Motor Co., for instance, would build the largest aluminum die-casting plant in the world just a step from Wilson Dam, and one-half mile from our central office.

• Northern Alabama grows and grows . . .

Gas consumption in northern Alabama has increased *because* of cheap power supplied by the Tennessee Valley Authority. It is just about the lowest-priced, large-scale electrical power supply in the U. S. TVA draws industry and consequently raises housing requirements. In spite of plentiful electrical power, this is no bar to the use of natural gas. Gas has proved cheaper for space heating in homes, industry and commercial installations.

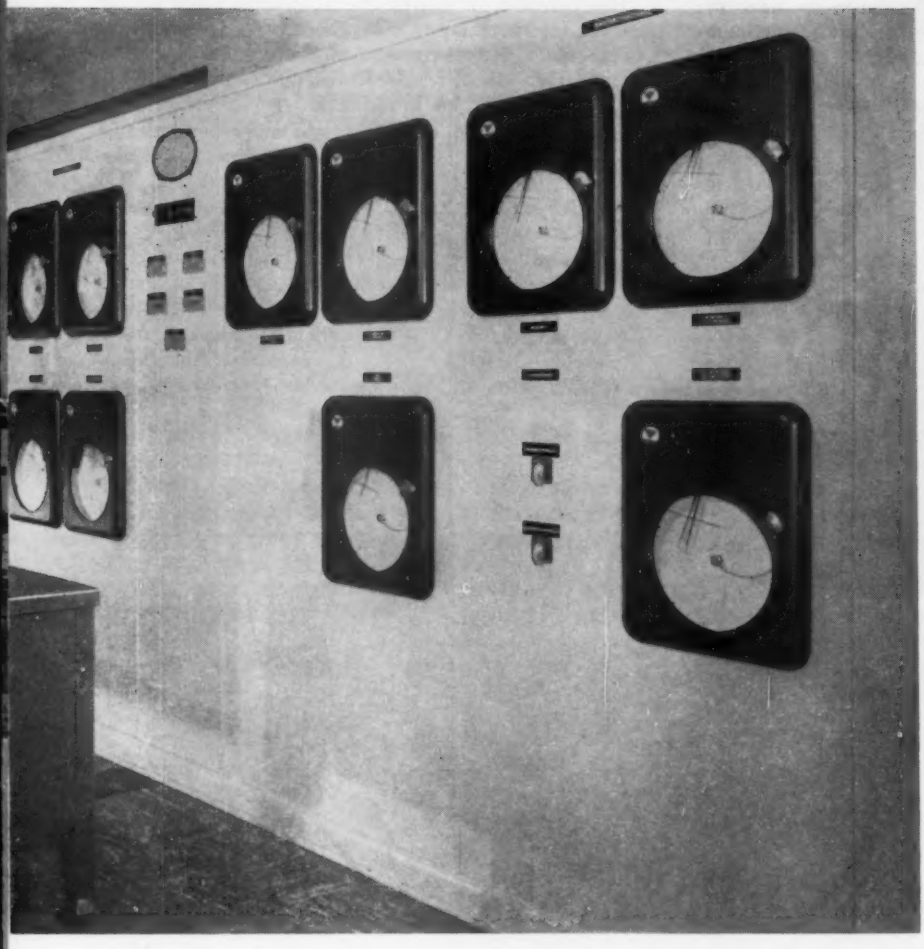
Other factors attract industry to the TVA area. There's a plentiful supply of water and low-cost freight transportation by river. Alabama-Tennessee itself saved close to $100,000 in freight costs by moving in its pipe on the Tennessee river.

As industry discovers the advantages of northern Alabama, the communities soar to house the manpower.

Huntsville is a prime example. Long a sleepy cotton town built around an amazing fresh water spring, Huntsville idled along until the Army Missile Center began designing Redstone missiles in 1950. Now known as the Rocket City, its population has rocketed from 16,437 in 1950 to 72,062 in 1960. In 1957-58, 23 housing developments were being built in Huntsville at the same time.

The number of meters in operation by the cities we serve at the end of 1959 were:

Residential	32,807
Commercial	3,236
Industrial	152
Interruptible Industrial	107
Total	36,302



This total is far greater than anything we anticipated 10 years ago.

In our original certificate of application, we indicated an original design capacity of 30,179 Mcfd. Today, authorized capacity is 79,435 Mcfd.

Obviously, growth like this has meant that shortly after making each estimate, actual demand begins to exceed any forecast. And there seems to be no end to growing, although the *rate* of growth may be leveling.

Here is a list of the industries that buy natural gas directly from our company.

The Ammonium Nitrate Plant of the TVA takes a steady demand of 5 MMcfd for use in the production of agricultural ammonia.

Reynolds Metal requires two meter stations to serve its reduction, alloys and cable plants. Gas volume to Reynolds increased 211 MMcf in 1959 over 1958 alone.

Ford Motor buys gas for space heating and aluminum die-casting operations. Their gas load increased 84 MMcf over the previous year.

Many other industrial plants purchase gas from the municipal utility systems that we serve.

The company sold 12,959 MMcf of gas in 1959, which was 592 million, or 5 per cent more than was sold, by volume, in 1958. Of the 1959 volume, 5962 MMcf was sold direct to industrial customers—Reynolds, Ford and TVA—and 6997 million was sold to gas utility companies for distribution.

• How the company copes with growth . . .

Telemetering is our answer to keeping pace with control along with growth. It means efficient centralized operations, more effective use of employees, profit for stockholders, and long-run savings for customers.

Our entire supply of natural gas is purchased from the Tennessee Gas Transmission Co. We rely on telemetering and remote control instrumentation to protect us on demand rate charges. If we can so regulate pipeline inventory that we save 1 MMcf of gas on a peak day, we can save $34,200 at present rates on gas that might have been purchased without the aid of telemetering. We save money by instantly cutting

pressure as demand drops off. At a glance we know the condition of the system and can maintain maximum sales to our interruptible customers.

Telemetering also helps reduce our unaccounted-for losses and reduces equipment fatigue because we confidently operate at much lower pressures. We also save on the number of personnel required to operate the system. These factors, of course, are especially beneficial to smaller companies.

Telemetering allows us to have all our operations under one roof—flow, pressure, dispatching and remote-set control, right next to accounting and billing —in one central location where executives can supervise to their best capabilities.

Ralph Sturges tells what telemetering means to him as measurement superintendent.

"Primarily," he says, "with instant, reliable information, customers get dependable service, because instant information means instant control. The result is complete confidence in our system and better service to customers. With an experienced dispatcher on each shift, we have control of distribution 24 hours a day to maintain a maximum load."

Telemetering gives Sturges continuous reports of line conditions—individual line flow, pressures at city gate stations, gas purchased, pressure regulation in unexpected demand and security against interruption from abnormal conditions. We're aware the moment there's the threat of trouble on the line.

Incidentally, in winter, the dispatcher keeps his eye on the weather map in his office to help determine requirements in northern Alabama. He posts changes in wind direction and temperatures, and can pack the line as soon as conditions so indicate.

But we've grown at a fantastic rate when you look back 10 years. Every summer we enlarge, build more lines and install more equipment of all kinds. In 1959, we added $365,000 worth of pipeline and other facilities, all financed through earnings.

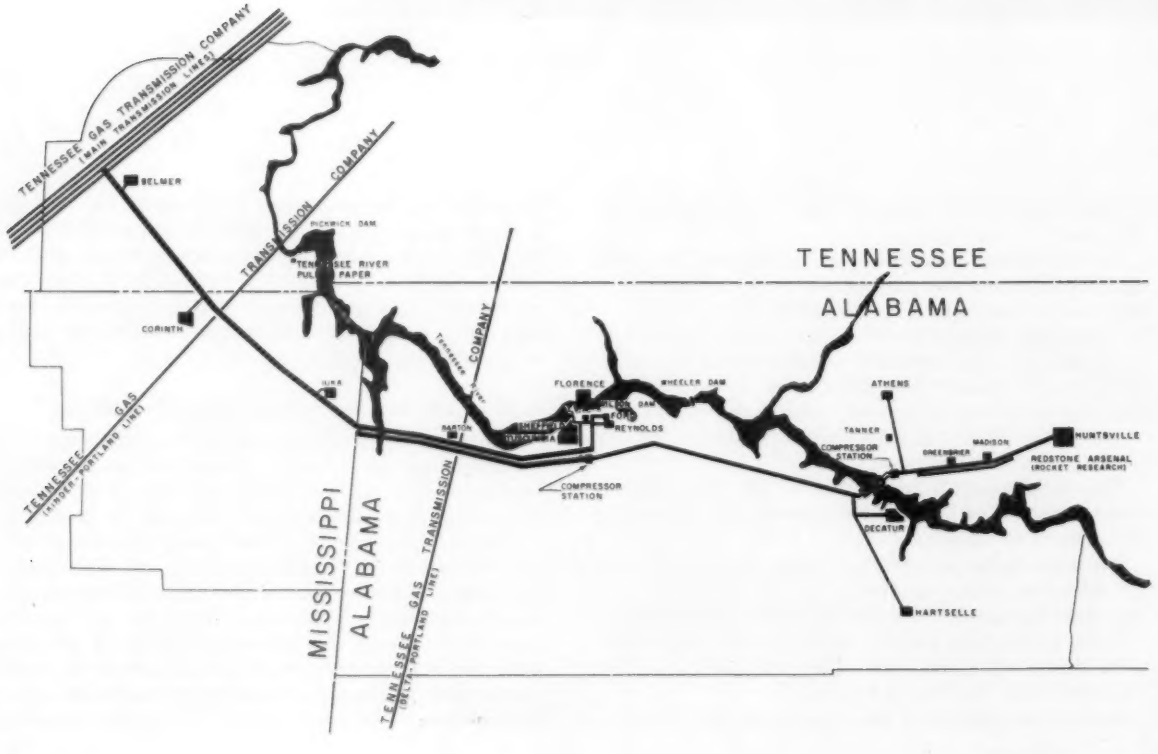
Our first expansion was the installation of one compressor unit, then another and another. Now we have two compressor stations, one with three compressor units and one with one unit. We have looped approximately one-third of our original 10-in. system with 12-in. pipe, and looped some of our smaller laterals with 10-in. pipe.

Our telemetering has grown along with this expansion. We began with American type A-88 double-integrating orifice meters with telecount at our larger city gate stations. Next we added pressure and differential transmitters at one of our compressor stations with the receivers in our dispatching office.

The results we obtained from this installation encouraged us to expand our telemetering equipment to our present network.

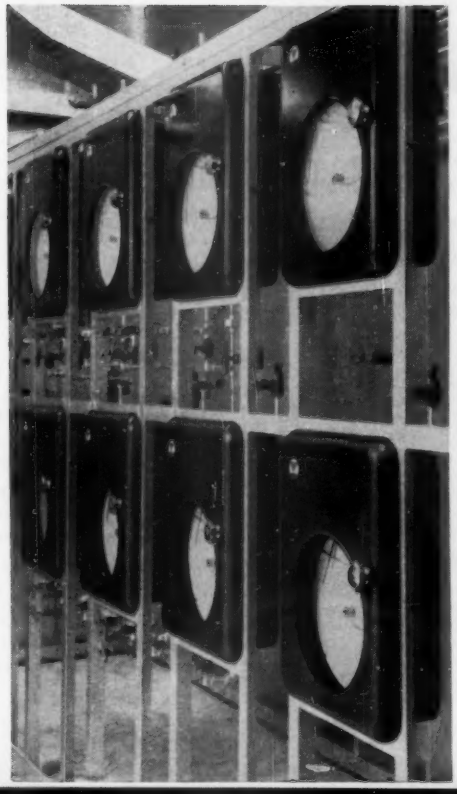
We now have one circuit from our Corinth, Miss. purchase station to our dispatching office operating with Hammarlund tone transmitting equipment. This

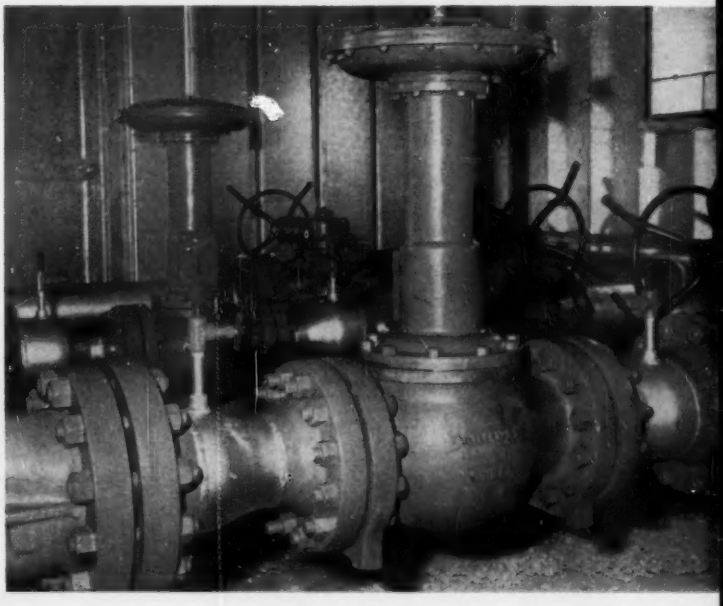
Alabama-Tennessee Natural's pipeline system.



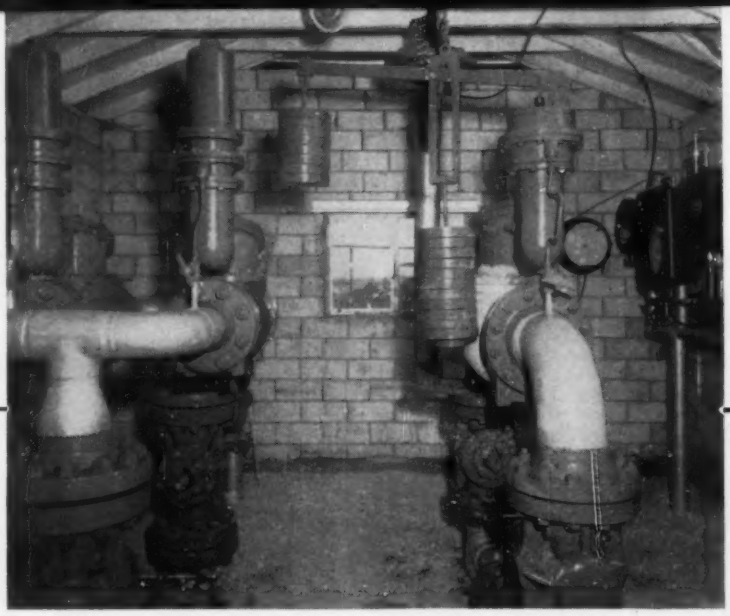
DECATUR TOWN BORDER STATION . . . At right are two 4-in. motor valves placed downstream of orifice runs. They are used as differential limit controls. View below shows 4-in. regulator (left), 2-in. regulator (right) in parallel, reducing from 250 to 82 lb. Both operate during winter, only the 2-in. in summer. Orifice meters and controllers are on right.

BARTON PURCHASE STATION . . . At left are telemetering transmitters mounted on specially designed steel rack. Rack, rather than solid panel board, simplifies maintenance and adjustments. By controlling 6-in. motor valve in foreground (below), Alabama-Tennessee can hold a set differential or volume, and let line pressure drop or float, depending on downstream requirements.

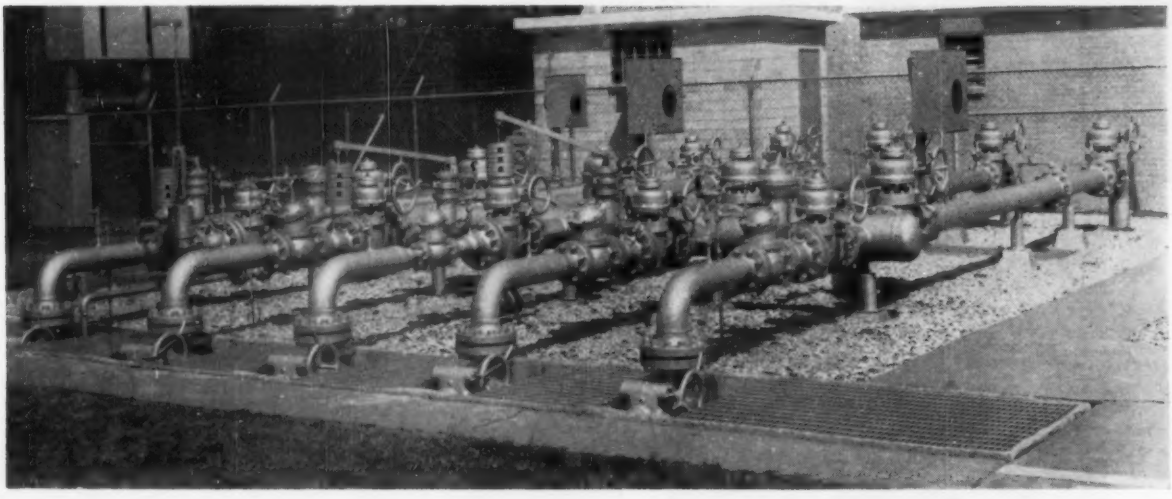


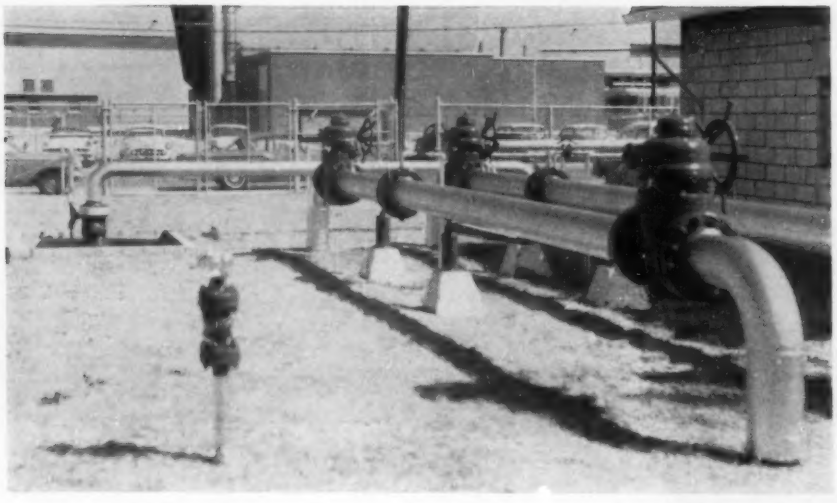


HUNTSVILLE TOWN BORDER STATION . . . At the end of the line, two-stage regulation is used (near right). Two 4-in. spring-loaded regulators reduce pressure from possible 600 lb to 250, depending on line pressure, down to 150-lb outlet. The 6-in. weight-loaded regulator on right reduces from 150 to 82 lb. On facing page are three 8-in. motor valves on downstream end of meter runs, controlled by individual differential trip-over valves.

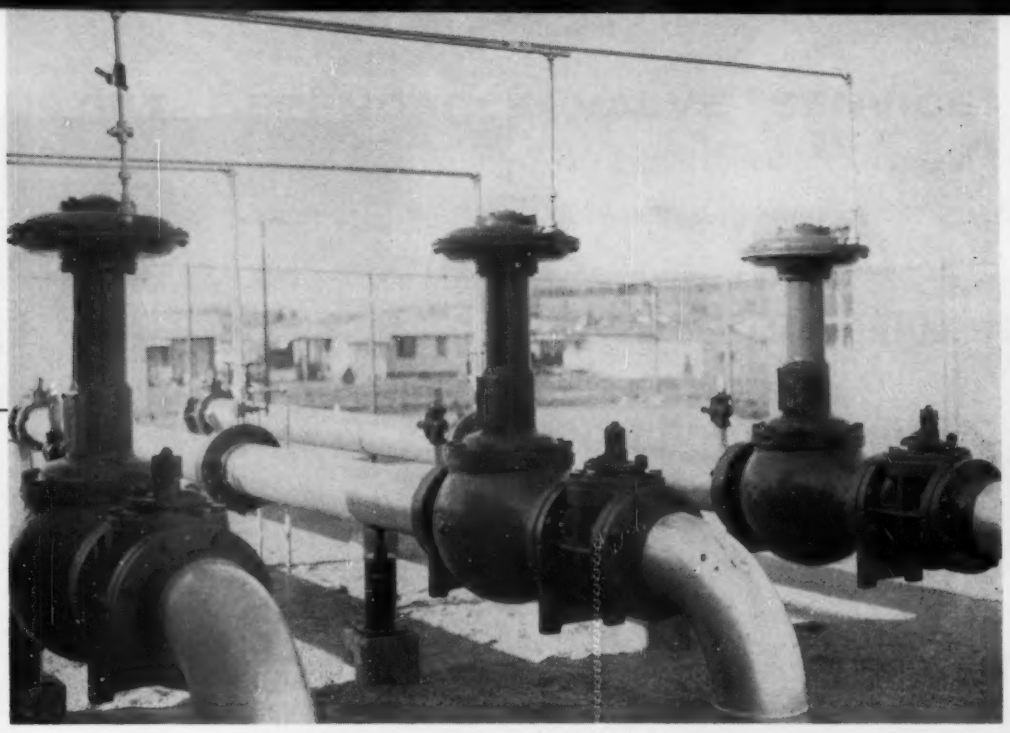


Six meter runs at Muscle Shoals check station are arteries at the heart of Alabama-Tennessee Natural, built adjacent to central offices in Sheffield, Ala.





Meter runs at Reynolds meter station serve Reynolds Metals aluminum alloys plant. Note that, since installed in 1950 for first time anywhere, 8-in. welded aluminum pipe has been used at 150-160-psi pressure to serve this customer.



circuit transmits our supplier's line pressure, the differential and static pressure on our two 8-in. orifice tubes, our line pressure and the gas temperature. In addition, we can, remotely from our dispatching office, change the settings on two Reliance type CBVA motor valves which regulate the flow into our line at Corinth. In January 1960 we placed in operation another purchase station at Barton, Ala. and duplicated the equipment and functions of our Corinth station.

We can now purchase gas through either or both of these stations and remotely control our line pressures to give us better line balance and reduce the operating time of our compressors.

Another telemeter circuit extends from Huntsville to our dispatching office and uses time sequence multiplex as the transmitting medium. From this circuit, we receive our line pressure, intermediate pressure, and differential and static pressures on three 8-in. orifice tubes at our Huntsville sales station. As this circuit passes through Decatur, Ala., it picks up the line pressure and differential and static pressures on two 6-in. orifice tubes at our Decatur sales station. Also at Decatur this circuit picks up telecounter signals from our Athens and Hartselle sales stations.

In addition to these long distance telemeter circuits, we have several local circuits. One for example is a telecount circuit from Reynolds Metals Co.'s largest aluminum reduction plant, just one-half mile east of our central office. Another is a telemeter circuit from Ford Motor Co.'s aluminum die-casting plant. On the Ford circuit we are using two American Dri-Flo differential transmitters and one American static pressure transmitter connected to a three-position cycle timer. The signal is then transmitted to our dispatching office and is received and recorded on one chart.

The reliability of American Meter equipment has been proven to us in the past, so we have used it exclusively in building our telemetering systems. All of our systems operate on lease lines supplied by the Southern Bell Telephone & Telegraph Co. The technical service, offered us by both the American Meter and Southern Bell, has helped us in planning our systems.

- **What does the future hold?**

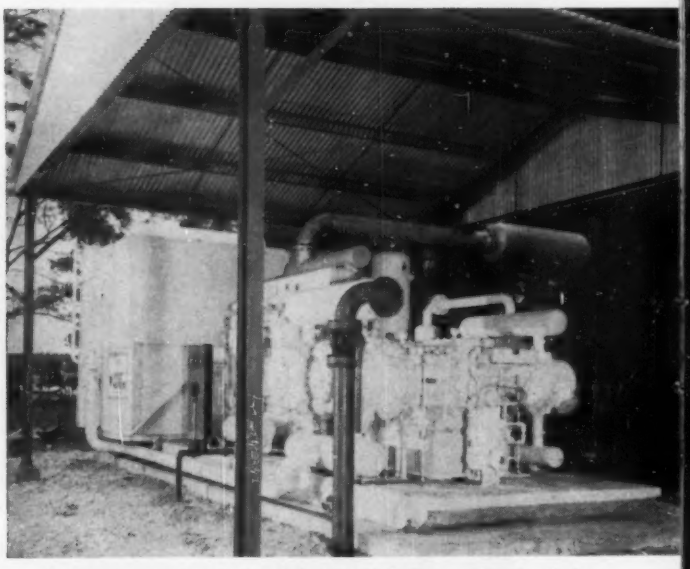
More growth—more gas sold. New industry continually moves into the area. A 13-mile, 6-in. line was laid recently to deliver 6 MMcfd of gas on a 100 per cent interruptible basis to Tennessee River Pulp Paper Co., a new plant near the Pickwick dam on the Tennessee river. This called for a new meter station incorporating two Type "P" Reliance regulators for primary reduction, and two Type "P" Reliance motor valves for secondary reduction, and American Series A-88 orifice meters. Static and differential pressures are telemetered to the dispatching station, using a tone frequency control telemetering system. The paper mill may increase its contract by an additional 1.5 MMcfd.

Minnesota Mining & Manufacturing Co. is one of several companies which bought plant sites on the river near our pipe line in 1960. It will use natural gas in making fluoro-chemicals and for space heating.

Thus far, Alabama-Tennessee has invested $50,000 for telemetering. Undoubtedly, this money is a fraction of the savings already realized through use of this equipment. Capacity will increase as demand grows, and instrumentation will be adapted to control the system.

Telemetering saves us and our customers money, because it allows us to operate intelligently and efficiently. I'm sure instrumentation will be used more and more as the demand for gas grows—for telemetering pays as it saves. ■

New compressor line in production



Engine-compressor unit located near Hull, Texas. The 8-cylinder engine is rated 635 bhp at 900 rpm. It is a 4-cylinder, balanced-opposed type compressor, Model W-64.

WHITE Diesel Engine division of White Motor Co., Springfield, Ohio, is producing a line of medium speed, balanced-opposed compressors for gas gathering, lifting, repressuring, and booster service.

For the past quarter of a century, Superior engines have been establishing an outstanding record of economy and service. Over 300,000 running hp, in constant field use, testifies to this fact. Many of the Superior gas engines have operated unattended and exposed to the elements for several years. The same rugged construction and simplicity of design is reflected in White W-62 and W-64 compressors.

The 4-cylinder (W-64) and 2-cylinder (W-62) compressors are designed for continuous, unattended, heavy-duty service and are engineered for direct drive with White Superior natural gas engines. Matched engine-compressor units are available from 200-1000 bhp operating at 600-900 rpm with the compressor using a 6-in. stroke. The 2-cylinder compressor covers a range from 200 bhp, with the Superior 6G-510 gas engine, to 635 bhp with the Superior 8G-825 gas engine. BHP rating up to 1000 is available with the W-64 4-cylinder compressor and the 8GX-825 8-cylinder supercharged natural gas engine. This provides the highest hp available for this type of engine-compressor combination.

White-Superior engine-compressor units represent an economic trend to more compact compressors with piston speeds and gas velocities not exceeding established slow-speed practices.

The balanced-opposed type compressors are produced in 2- and 4-cylinder models. Sixty-eight standard cylinder sizes range from 4000 psi with the 2⅝-in. diameter cylinder to 85 psi in the 22½-in. diameter cylinder. All cylinders mount interchangeably on both 2- and 4-cylinder compressors in any combination.

Officials of White Diesel point out several outstanding features of the compressors. For example, the complications of a belt drive are eliminated because the engine and compressor are in direct drive and at engine speed. In this way, restrictions on engine speeds are removed. It is also stressed that, since the engine can run at optimum speed instead of at a lower speed adapted to compressor piston speed, a yield of greater hp can be had from an engine of the same weight and size.

Greater power load capacities is another outstanding feature of White's compressors. Maximum rod load of 25,000 lb, which is 25 to 40 per cent greater than units of similar design, has been reported. White Superior natural gas engines and compressors are designed for heavy-duty operation. They will handle continuous operating loads and temporary overloads with ease. Fatigue-proof split precision bearings, found on the compressor, are interchangeable with White's heavy-duty diesel and gas engines. Other equipment, such as water pumps, aerial coolers, etc., can be driven by an auxiliary driveshaft on the compressor if required.

Extra heavy parts are used in the compressor such as crankshaft and ribbed castings in the frame. The frame is reinforced against all operating stresses. Forged alloy steel piston rods and extra rigid connecting rods contribute to the ruggedness of the compressor. Rigidity of bearing caps is assured through use of four connecting bolts. The connecting rod cap also makes use of the 4-bolt design.

Additional features reduce costly downtime. Crossheads are removable through the side of the crosshead guide without disturbing the cylinder mountings. The replaceable crosshead shoes are designed for maximum lubrication. The crankshaft is easily removed through the top of the frame. The four-speed lubricator and lube oil pump, including drive gears for both, are removed as separate units without disturbing the end cover. ■

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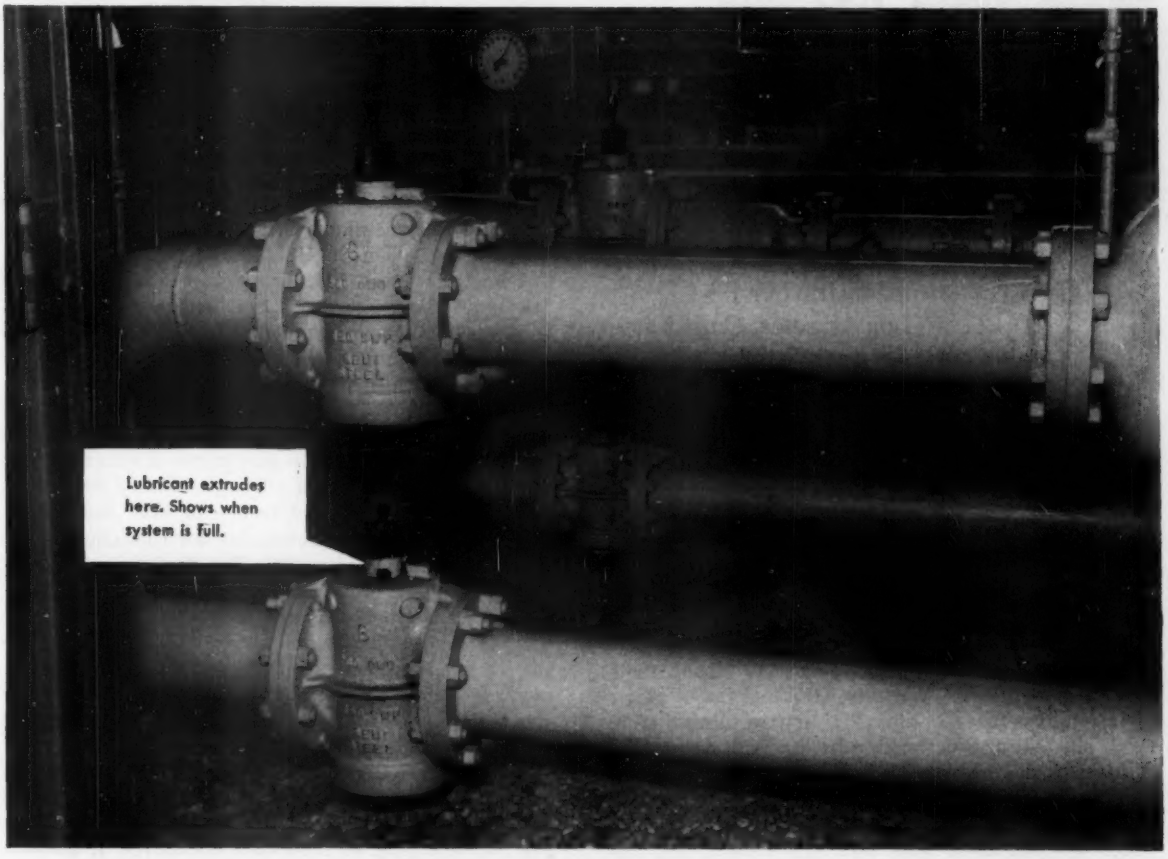

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More from Gasville

By J. FRED EBDON • Editor

The situation in Gasville, U.S.A. (Los Angeles, Calif.) is normal; i.e., confused.

ALL I have to report is several assorted filings by Southern California Edison Co. (L.A.-based electric utility) and subsidiaries of TGT; a ping-pong approval of the "Rock Springs" project; highly interesting reports from Mexican newspapers with which one can play "True or False"; and incipient developments of another project to bring Mexican gas into the Los Angeles basin for conversion to kilowatts.

First, a light-hearted pox to TGT and SoCalEd for their "night-before-Christmas" timing of filings before FPC. This editor was working hard at a day or two of vacation just before Christmas. I was home quietly shaking packages under the Ebdon's Christmas tree (to see which ones gurgled) on Dec. 23 when the phone rang. "Do you know that TGT and Edison filed Enchilada Inch applications with FPC?"

Having been doing more important things, I didn't know of the event. As a matter of fact, I had sometime earlier found a package that did gurgle and at the moment the phone belled, I couldn't have cared less about who had filed what with whom and why.

Having been forced to abandon white-flocked reveries, I soon found that most news-funneling contacts and associates had, it appears, also given up the work week and/or had found an interesting package or two under their Christmas trees. Facts were simply hard to come by on the Friday before the Christmas Holidaze.

Later it was established that two TGT subsidiaries and Edison had presented FPC with three pretty hot potatoes in the way of applications.

Tennessee California Gas Transmission Co. asked FPC for a Presidential Permit to build and operate some facilities for exportation of natural gas from Texas (and the United States) to Mexico.

Another TGT unit, California Gas Transmission Co., sought a Presidential Permit from FPC to build and operate facilities for importation of gas from Mexico into California.

Concurrently, Southern California Edison Co., as purchaser of said gas to be transported by the TGT affiliates, applied to FPC for authority to export Texas-produced gas and then import the same gas, plus additional Mexico-produced gas, into the United States at the Mexico-California boundary near Mexicali.

These applications seem simple and uncomplicated. And they are until you start trying to think like a lawyer and wonder how judges and commissioners will interpret certain aspects. Perhaps it is a modern human frailty that makes really simple things so complicated these days.

For, complicated is exactly what the entire Enchilada Inch project will get.

Prior to perusal of complications, a short review is warranted. The deal flanges up with SoCalEd buying Texas gas from Humble Oil. (Up to 265 MMcfd for 20 years is tied up in the Humble-Edison contract.)

Tennessee California Gas Transmission Co. will transport this gas to the U. S.-Mexico border. There, a pipeline to be owned by Mexico's Pemex, but operated by TGT or some unit thereof, will move the gas across Mexico on a transportation basis.

In Mexico, PISA, a TGT offspring, will purchase at least 75 MMcfd from Pemex for SoCalEd. It will commingle with the Humble gas in the Enchilada Inch while being transported through Mexico by Pemex for the PISA account. Edison can take this PISA-Pemex gas on the California border. Too, some of it may be available for resale. The Humble gas is specifically not available for resale.

Interestingly, the Humble Gas will move from Texas through Mexico and through California to utilization via a single continuous pipeline—"broken" by owning-company names only. The ends of this pipeline are obviously in two different states. But the middle is in Mexico.

The Natural Gas Act says interstate commerce is natural gas commerce that takes place in the United States only. TGT, Edison, et al, obviously feel they are not engaging in interstate commerce of natural gas. Opponents most likely will present an opposite view.

Further, it seems the Natural Gas Act isn't the most precise thing in the world when it comes to defining a natural gas "exportation" and "importation." The TCGT and CGT applications speak of facilities for exploration and importation of natural gas. Hence, it would seem the TGT subsidiaries imply their or Edison's participation in such activities. Yet, exports and imports must have an FPC order under the Natural Gas Act.

Such orders are normally issued upon application unless FPC finds the exportation or importation not consistent with the public interest. However, the CGT and TCGT applications did not go into a whole lot of explanation as to what the facilities they seek for the exportation and importation are, and seemed to pass by such things as cost, economic feasibility, and financeability. Public convenience and necessity are not dwelled upon in the applications, either.

So, while it may all seem simple, there will be a sharp difference of opinion over: (1) when Edison buys gas in Texas and uses it in California, after moving the gas through Mexico, is that interstate

commerce?; (2) is Edison's Texas-produced gas to be moved by others from Texas into Mexico and out of Mexico into California an exportation and importation which might require a finding of public convenience and necessity?; (3) is Tennessee California's transportation of Edison's gas out of Texas into Mexico an exportation?; (4) is California Gas Transmission's movement of Texas-produced gas from Mexico into California as transportation gas for Edison an importation?; (5) is CGT's purchase of Mexican-produced gas from PISA at the border and movement into and through California for Edison, and perhaps others, an importation?; and (6) how applicable is the Hinshaw Amendment to the Natural Gas Act which exempts from FPC jurisdiction a company that takes gas in or at a state border for total consumption within that state and any facilities used for in-state transportation of it?

Apparently, California Gas Transmission feels the Hinshaw Amendment exempts it or that FPC has no jurisdiction over it in the first place since it has filed wtih California's PUC for authorization of its in-California facilities. CGT's only FPC application is for the Presidential Permit for some facilities to permit an import. The Cal-PUC hearings on this matter start Jan. 25, just a few days from this writing.

This unlettered and unlegal mind has no idea how the whole thing will turn out. I do think, however, that most gasmen will have a great deal of admiration for whoever dreamed up this whole deal. Win or lose, the Enchilada Inch project shows a lot of imagination, careful legal consideration, courage, and plenty of good old business initiative. Perhaps such idea production morally deserves a reward. However, "The Project," as TGT terms the thing, is a long, long way from home.

Ping-Pong Approvals for Rock Springs

EL PASO NATURAL GAS CO. and Colorado Interstate Gas Co. finally got FPC approval on Dec. 27 to build the Rock Springs project. This plan is designed to put another 470 MMcfd into market areas of southern California.

Then, on Dec. 28, the Public Utilities Commission of the State of California authorized the project of Southern California and Southern Counties gas companies to pick up Rock Springs gas at the California-Nevada border and bring it across California to the Los Angeles basin and other southern California markets. In their decisions, each regulatory body seemed to say to the other: "You take it, sport."

FPC conditioned its approval to EPNG and CIG on the approval of the southern California companies' part in the project, including their proposed markets, by the California commission. The "stinger" in the market picture is, of course, Southern California Edison. SoCalEd's contract with the Pacific Lighting companies expires in 1962. And if Edison actually gets gas from the Enchilada Inch, it would be wild thinking indeed to assume that the contract will be renewed. Since FPC has no direct jurisdiction over either Edison or SoCal and SoCounties Gas, it tossed the ball to the California commission.

FPC plainly passed to Cal-PUC the question: Is it in the best interests of southern California consumers that Edison's gas requirements be met by Southern California and Southern Counties gas companies or from Humble-TGT-Pemex? The California body, in turn, approved the SoCal and SoCounties plans to construct and operate the 34-in. pipeline from near Ivanpah valley (near the California-Nevada border) to Newberry, Calif. But they attached some conditions that require extensive revisions.

If said conditions are met, there is speculation that an FPC rehearing might be required. There are some who even say that this was an objective of the Cal-PUC; i.e., toss the ball back to FPC.

Ordering subparagraph 1 of the California PUC decision conditions the certificate on renegotiation with El Paso Natural for new gas supply contracts. The new contracts should (1) eliminate the need for a rate increase during the early years of the project; (2) reduce the period before the project is economically feasible; and (3) provide a load-building period and importation program that will maintain a reasonable balance in the two-fuel economy of southern California, taking into consideration recent changes.

Other conditions specify a revised economic feasibility study, more paper work for all involved companies, and a Btu adjustment clause. No construction can start without a further order from PUC. There is no spelling out of just what the commission will consider to be compliance with conditions imposed. Former California PUC commissioner Matthew J. Dooley said this in his dissent: the conditions are "... anomalous in general, uncertain in application, and practically postulate what is tantamount to a rehearing even if applicants are endowed with divine prescience in attempting to comply with the conditions imposed upon them."

Actually, the whole situation is probably not as bad as one thinks it is from a first reading of the Cal-PUC order. The pipeline companies and the California distributors both want Rock Springs badly and can renegotiate very readily, in all probability. There is nothing in the conditions that cannot be lived with, providing all parties really want to set up house keeping under the Rock Springs roof.

Construction involved looks like this:

Colorado Interstate will build a 155-mile, 34-in. line from Rock Springs, Wyo., to Provo, Utah. Also,

the company will build 476.6 miles of additional line in its system and install 83,800 compressor hp. CIG's cost: $92.8+ million.

El Paso Natural will build 394.6 miles of 34-in. pipeline from Provo to the Nevada-California border near Las Vegas. There will be a 7200-hp compressor station on the El Paso line. Total cost to EPNG will be about $58.7 million.

To be constructed by Southern California and Southern Counties gas companies are 92.9 miles of 34-in. pipeline from Ivanpah valley to existing facilities at Newberry, and a compressor station at both Newberry and Valley Wells. Total cost: $24.6+ million.

The renegotiations to satisfy PUC conditions are going ahead as rapidly as possible. While it is doubted that anything concrete has been inked as early as we go to press, there have been no major stumbling blocks turned up and none are contemplated.

From South of the Border

FOR some time reports have been circulated in Mexican newspapers about several natural gas pipeline projects that would compete with or replace the Enchilada Inch. This was, of course, expected by this editor as every pipeline project ever proposed picks up promoters who wish to cut a piece of the deal and detractors who like to kill just about anything.

It is easy to discord an even half-dozen projects that would displace or augment the TGT-Pemex-Humble-SoCalEd lashup and plans. On the other hand, there is one company which, while it has made no announcement, might have some substance behind it and might possibly move into the scene. Its chances right now, however, are exceedingly remote.

This company is International Gas Co., Los Angeles. International is saying nothing and all we know about it is from reading Mexican newspapers—some of which, like Mexico City's Las Novedades, are excellent news media maintaining extremely capable personnel and laudable publishing standards.

International would construct a 30-in. natural gas pipeline initiating in the Reynosa fields and swinging south to Durango before crossing the lower Sierra Madre range. Gas would be supplied to Mazatlan, Culiacan (capital of the state of Sinaloa), Los Mochis, Navajoa, Ciudad Obregon, and Hermosillo.

It too proposes to cross the International Boundary near Mexicali—which should have quite a boom with seven or eight pipelines "scheduled" to pass through it. The objective of moving up Mexico's and California's Pacific coast would be to serve firm gas to large industrial loads in the Los Angeles basin, such as Southern California Edison, Los Angeles Department of Water & Power, and municipal power plants in the cities of Glendale, Pasadena, etc.

Although a great many additional details are at hand, it is pointless to pass them along as International Gas Co. does not choose to put the rumored project on the record as we go to press.

Tying in with some thoughts connected with International's long-term philosophy (they have been working on this thing for several years), was a report in Jan. 3 editions of two Mexico City newspapers. The stories said that the Mexican government had flatly turned down a proposal by Tennessee Gas Transmission Co. and Southern California Edison Co. for the Enchilada Inch. Both "The News," an English-language newspaper, and the highly influential and respected "Las Novedades" carried such stories.

According to these sources, Pemex was credited with saying that President Mateos does not want Mexico capital (Pemex money) associated with a project that would bring Standard Oil of New Jersey's (or any of its subsidiaries') natural gas into and through Mexico.

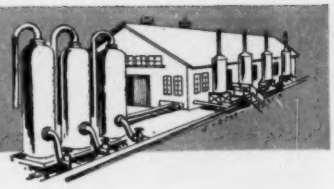
Seemingly, this feeling (if true) was generated by animosity between Standard and the Mexican government before, during and after the expropriation of U. S. oil companies' properties and assets in Mexico by that country's government in 1938. Below-the-border news sources allege that Standard and subsidiaries attempted to freeze development of Mexico's oil industry during the post-expropriation period.

The Associated Press followed the next day with a story saying Pemex denied there had been any kind of a break in negotiations with TGT and SoCalEd. Other stories indicated that the Mexican government was holding up on a decision to join the Enchilada Inch project pending clarification of unspecified legal matters. Still another source said it is "very likely" that Pemex will participate in the project after some legal studies.

In any case, neither TGT nor Southern California Edison places any reliability on the reports and are working away as if nothing was ever mentioned. Too, it is inconceivable that companies such as Humble Oil & Refining Co., Tennessee Gas Transmission, Southern California Edison, and the government-controlled oil monoply in Mexico—Pemex—would have gone this far with the Enchilada Inch project only to find the alleged problem turning up at this stage of the program's development. None of these firms is noted for stupidity in depth.

We will surmise, based on the record to date, that if International Gas Co. has feasible plans and designs, and can finance them, it will have to wait for the ultimate decisions on the current Enchilada Inch plans from Mexico and from commissions and courts in the U. S. Right now, this looks like a long wait. ■

GAS PIPELINE NEWS



Northern serves Minnesota mine

The first large-scale use of natural gas for processing of taconite iron ores is planned by Northern Natural Gas Co. and Reserve Mining Co., Silver Bay, Minn.

Northern has asked FPC for authority to sell 12 MMcfd of firm gas to Reserve for use in its pelletizing furnaces. Another 14 MMcfd would go for power plant requirements. The firm gas will be sold directly to Reserve. All other requirements would be available through Iron Ranges Natural Gas Co., St. Paul, which will distribute gas in Silver Bay.

Reserve Mining said the use of natural gas in the final stage of benefication process and in the generation of electric power for its plant operations will result in substantial savings in fuel costs.

Northern will have to build a 63-mile branch line from Duluth to Silver Bay and increase its mainline compression facilities. Total cost is an estimated $6 million.

Reserve Mining, owned by Armco Steel Corp. and Republic Steel Corp., was the first company to produce commercial iron ore pellets from taconite. Company engineers say that the use of natural gas will "produce substantially better burning conditions of the green pellets in the pelletizing furnaces."

'59 gas prices averaged 14.3 cents

Interstate pipelines purchased over 7.5 trillion cu ft of natural gas directly from independent producers in 1959, according to an FPC staff report. Total cost was $1,075,052,466, for an average of 14.3 cents per Mcf.

In 1958, total sales were 6.8 trillion cu ft at an average cost of 13 cents per Mcf. In 1957 the average cost per Mcf was 12 cents.

The interstate pipelines themselves produced 917.2 billion cu ft of gas in 1959 and purchased 10 billion cu ft of manufactured and LPG.

The 1959 sales to pipelines were made by producers in 21 states and Canada and Mexico.

Seventy-five per cent of the total sales were by producers in two states. Texas accounted for 46.5 per cent; Louisiana, 28.5 per cent. Sales in only three other states were as much as 5 per cent of the total: Kansas, 5.8 per cent; Oklahoma, 5.6 per cent; New Mexico, 5.0 per cent.

Hear UGPL plans

Hearings are under way on United Gas Pipe Line Co.'s $16.9 million construction plan (Docket CP60-36 et al).

New facilities will transport 330 MMcfd from Bastian Bay and West Bastian Bay fields in Plaquemines Parish, La., into UGPL's system. Involved is 59 miles of 36-in. line.

J. W. Sharman, president of pipeline contractors Sharman, Allen, Gay & Taylor Inc., gives the go signal as the 1300-mile LPG Trans-Southern pipeline gets under way. Scene is the Tombigbee river in Alabama. With Sharman is Don S. Willhelm, chief engineer for Trans-Southern, subsidiary of Transcontinental Gas Pipe Line Corp. When completed the line will move LPG from cycling plants and refineries in Louisiana and Texas to the southeastern states.

Waiting to be pulled across the Tombigbee river . . . The 10-in. pipe, covered with a permanent asphalt mastic coating, will lie in a ditch 11 ft deep beneath the floor of the river.

Trunkline boosts system capacity

Construction is getting under way immediately on Trunkline Gas Co.'s system which will boost its capacity by 95 MMcfd. Benefiting are four new wholesale customers and four existing customers in Missouri, Illinois and Indiana (Dockets CP60-22 et al).

Trunkline's $25.1 million project will raise its daily system capacity from 510 million to 605 MMcfd. Fifty million cu ft of the gas goes to Mississippi River Transmission Corp., a new subsidiary of Mississippi River Fuel Corp., St. Louis. MRT was authorized to build pipeline and storage facilities costing about $9.8 million.

New customers and their volumes: Northern Indiana Public Service Co., Hammond, 20 MMcf; Central Illinois Electric & Gas Co., Rockford, 1.6 MMcf; the City of Rensselaer, Ind., 2 MMcf.

Four existing customers getting boosted supplies are: Central Illinois Public Service Co., Springfield, 1.4 MMcf; Citizens Gas Co., Tuscola, Ill., 180 Mcf; United Cities Gas Co., Chicago, 300 Mcf; and the City of McLeansboro, Ill., 215 Mcf.

Trunkline's project includes about 155 miles of 30-in. mainline, paralleling sections of its existing system, and 69 miles of supply lines in Louisiana. Trunkline also will deliver 17.9 MMcfd to its parent, Panhandle Eastern Pipe Line Co.

Mississippi Transmission plans about 94 miles of line extending from Clay County, Ill., to the St. Louis area. It will sell 42.5 MMcfd to Laclede Gas Co., St. Louis, and 7.5 MMcfd to Illinois Power Co., Decatur.

The new transmission company also was authorized to develop underground natural gas storage in the St. Jacob field area in Madison and St. Clair counties, Ill. However, Mississippi Transmission later told FPC that it could not comply with conditions imposed. It asked, and received, permission to proceed with the pipeline facilities and to postpone the storage project.

Court hits Texas tax

The Texas Legislature's effort to tax natural gas on a "severance beneficiary" basis received a telling blow from the Third Court of Civil Appeals.

The court agreed with contentions of Transcontinental Gas Pipe Line Corp. (representing a consolidation of suits brought by more than 80 companies), that the tax violates the commerce clause of the U. S. Constitution.

The majority (2-to-1) opinion by Associate Justice Robert G. Hughes concluded:

"The knowledge which we have of the judicial, legislative, and political history of this act compels a construction of it consistent with its plainly expressed and avowed purpose: to tax the last purchaser of gas in this state under dedication contracts. This is usually a pipeline.

"To construe the act as (the state) desires would saddle a substantial portion of this tax upon the processor or first purchaser and not upon the pipeline, contrary to its language and contrary to its historical purpose."

The opinion is held particularly significant because this same court, in 1953, upheld the state's natural gas "gathering" tax which later was declared unconstitutional by the U. S. Supreme Court.

Processing plant in operation

A $13 million system of plants for processing southwest Louisiana natural gas is in operation.

Described as the largest of its kind in the U. S. and the first in Louisiana, the system includes plants on Cow Island, Vermillion Parish, and Riverside, La. An 88-mile pipeline connects the two.

Union Oil Co. of California and the Goliad Corp. are joint owners, with Goliad as the operator.

The Cow Island plant takes the raw gas from the on- and off-shore fields. It removes liquids from the gas and turns about 500 MMcf of the dry gas daily into transmission lines. The raw liquids move through the 88-mile line to Riverside, where they are broken down and prepared for marketing in the Baton Rouge-New Orleans refining and chemical center.

First pipe laid from Canada to California

The first pipe in the 1400-mile, $300 million Alberta-to-California gas pipeline was laid near Klamath Falls, Ore. When completed late this year, the line will bring gas from the eastern foothills of the Canadian Rockies through parts of two Canadian provinces and four western states to Antioch on San Francisco bay.

The pipe lowered into the ground at the California-Oregon border was the first of 914 miles of 36-in. to be installed between San Francisco and Canada.

Contractor on the California section of line is H. C. Price Co. The joint firm of Western Pipeline Inc. and J. P. Neill & Co., Inc., is working on the southern Oregon portion.

Pacific Gas Transmission Co. awarded a contract for river crossings of the Kootenai and Pend Orielle Rivers in northern Idaho to River Construction Co.

Steel specs published

The 1960 edition of the compilation of ASTM Specifications for Steel Piping Materials is available. This is the handbook of American industry for the production, sale, and purchase of steel pipe, tubing and accessory materials.

Specifications in the compilation cover (1) pipe used to convey liquids, vapors, and gases at normal and elevated temperatures; (2) still tubes for refinery service; (3) heat exchanger and condenser tubes; and (4) boiler, superheater, and economizer tubes.

Copies of the book may be obtained from ASTM Headquarters, 1916 Race St., Philadelphia 3, for $7 each.

El Paso Supply files

On file at FPC is El Paso Gas Supply Co.'s proposal to spend $29.6 million on new pipeline facilities (CP60-101).

The newly formed, wholly owned subsidiary of El Paso Natural Gas Co. is going to transport up to 210 MMcfd for its parent. It will have to build about 227 miles of 30-in. line from Live Oak County, Texas, to El Paso's Sonora plant in Sutton County; a 7000-hp compressor station; and communication, metering, and appurtenant facilities.

Helium reports available

To boost interest in helium conservation, the Bureau of Mines has placed reports on helium-bearing natural gases on open-file.

The reports should be useful to natural gas companies considering participating in the government's newly launched helium conservation program.

While not yet published, the reports may be consulted at the office of the Assistant Director of the Bureau of Mines for Helium, Room 4627, Interior Bldg., Washington, D. C., or at the Helium Operations Office, Bureau of Mines, Room 514, Barfield Bldg., Amarillo.

El Paso gets nod

El Paso (Texas) Natural Gas Co. can build new facilities to acquire, process, and transport gas from the Brown-Bassett field in Terrel County, Texas (Docket G-19966). El Paso got a temporary certificate on the project a year ago.

Western Natural Gas Co., Socony Mobil Oil, and Continental Oil will sell up to 221.1 MMcfd of raw gas to El Paso.

RCA makes microwave breakthrough

A major breakthrough in microwave technology is reported by Radio Corp. of America. It has developed a tiny solid-state electronic device—a "varactor" diode—that should have a profound impact upon military, commercial, and private communications.

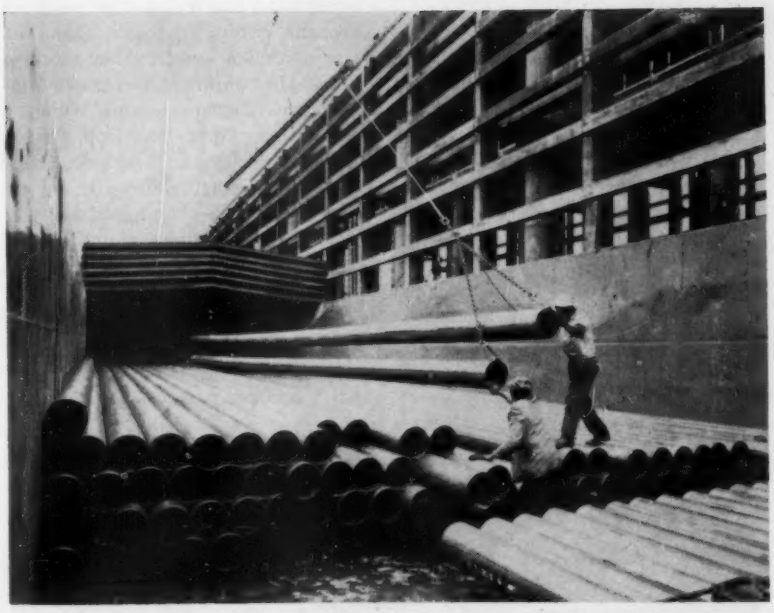
RCA expects the new diode to make three major contributions in the field of communications because of its size, weight, and sensitivity:

1. Facilitate development of microwave communications systems that would be virtually invulnerable to jamming.

2. Extend communications into the higher frequency radio bands, thus multiplying the amount of traffic that can be carried.

3. Make possible low cost, highly efficient, long-lived and more compact microwave signal receivers that can be used in a variety of applications.

The new diode is one of seven announced by RCA that operate within a frequency range from 2000 to 20,000 megacycles.



Handy expressway is the long, wide Mississippi river which just carried four barge loads of 12.75-in. pipe from Cal-Metal Pipe Corp.'s Baton Rouge plant via the Intracoastal Waterway to Houston. The 32 miles of pipe was loaded on four barges in about two days. Each barge holds 600 tons of pipe.

Sun expands

Sun Oil Co. is building a new gas plant at Marcus Hook, Pa. It will be tied in with a consolidation of existing gas processing facilities at a cost of $9.3 million.

The plan will have an initial daily capacity to separate 14.4 MMcf of dry gas, 7100 bbl of liquefied propane and propylene, 13,200 bbl of liquefied butane, and 18,000 bbl of gasoline.

Producers must file

In an amendment to its regulations, FPC has required natural gas producers to file statements annually showing their sales and revenues.

In the past, FPC required producers to file reports, but in each instance the prescribed form did not apply to future years.

GAS • Pipeline Notes

Colorado Interstate Gas Co.'s newest compressor station has boosted daily delivery capacity of the company's Wyoming line to 188 MMcf—a 50 MMcf hike. The 4500-hp station is eight miles east of Rawlins, Wyo., on CIG's Green River-Denver transmission line.

. *Shareholders* of Monterey Oil Co., Los Angeles, approved the liquidation plan and the sale of most of its assets and properties to Humble Oil & Refining Co. Excluded from the sale to Humble is Monterey's ownership of 950,000 shares of Transwestern Pipeline Co. common stock, currently valued at $12.3 million.

Two wholly owned subsidiaries of Armco Steel Corp. merged with Armco recently. National Supply Co. is now operating as the National Supply division of Armco. Likewise, Union Wire Rope Corp. will be operated as a separate unit of Armco.

Union Texas Natural Gas Corp., Houston, is entering the field of applied physics and advanced electronics through a newly formed company, Quantatron Inc., Santa Monica, Calif.

Malloy J. McQueen was named deputy general counsel of FPC. McQueen formerly was associate general counsel of the Department of Health, Education, and Welfare.

Commissioner Arthur Kline has been re-elected by members of FPC to serve as vice chairman for another year.

regulatory • *Cont'd.*

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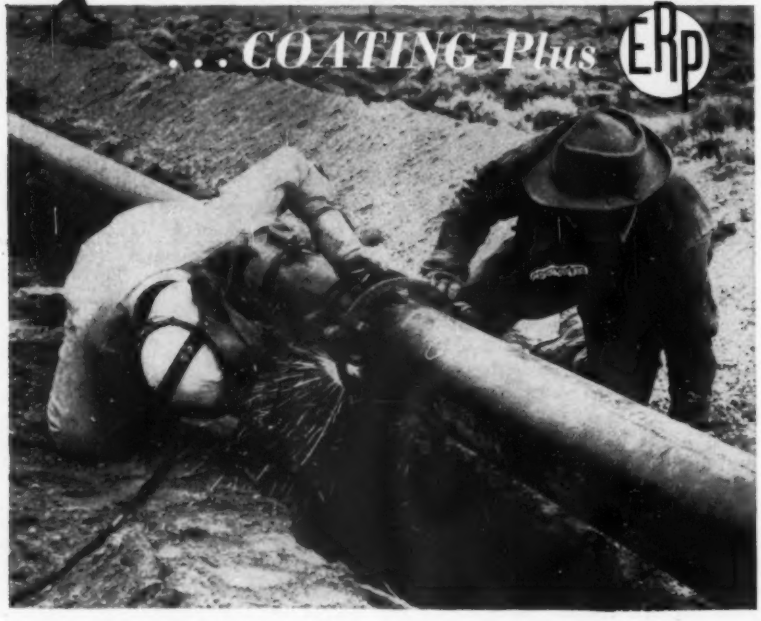
and that it must reflect conditions in the money market.

The commission must apply these objective standards, asserted Mr. Brackman, in the face of constant public criticism of increasing rates and diminishing railroad passenger service. He added that "This experience has caused a significant segment of the public to lose confidence in the integrity of public utility commissions and to make commissioners, often for political reasons, whipping boys. Some of this criticism is, of course, sincere, since the uninitiated cannot discern the deeper reasons which I have mentioned causing these trends in rates and service. Commissioners must constantly be on guard that their opinions and actions are not influenced by factors other than the facts and circumstances then before them."

In summarizing his philosophy, Commissioner Brackman made this encouraging statement:

"A public utility commissioner has these duties and responsibilities: to be familiar with the history of regulation; to understand the meaning of objectivity in the light of the dual capacity of a public utility commissioner as a party and as judge, and to cultivate in his own judgments this quality; to become familiar with the fundamental characteristics of the industries over which he exercises control; to exercise a wise discretion over the procedures followed before the commission, having in mind the basic guides of fairness to the parties and uniformity of application, and finally, to cultivate a public awareness of the limitations of regulatory control over the basic economic conditions which give rise to increasing rates in some industries and diminishing service in others." ■

Rx FOR SURE PROTECTION



You've made a worthwhile investment in this pipe. You've spent some more on cleaning and coating. Why risk the cost of digging it up in a few years to repair corrosion damage?

With ERP protection you won't need to. Electro Rust-Proofing takes care of those pinpoints of corrosion that even the best coating cannot prevent. When your pipeline is laid, ERP makes a test survey to determine your needs. Once cathodic protection is installed, a periodic service visit by ERP engineers keeps your pipeline new—for good. They adjust your protection as your needs or environmental conditions vary.

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Corrosion • *Cont'd.*

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If all of these fail, and the short is within the casing, then it will probably be too expensive to entertain the idea of repairing it. Supplementary protection, usually in the form of magnesium anodes, can supply the local demand of the casing exterior, and thus get rid of the long low-potential sag in the line. This does not solve the problem of the pipe inside the casing, however; it is still impossible to reach it with cathodic protection.

This final difficulty can be overcome by washing and drying the casing interior, working through the vents, and then filling the annulus with a grease compounded for the purpose. This will not nullify the original purpose of the casing, since a leak within will still result in a flow of oil or gas through the vent, rather than a destructive and dangerous roadbed washout. Although expensive, this process is usually cheaper than a complete shutdown and re-installation.

• Summary recommendations

(1) Casings should be coated; this will minimize the remedying of later difficulties.

(2) Seals and supports should be of the best quality, generously supplied, carefully installed, immediately inspected, and, if necessary repaired.

(3) Shorted casings can be protected with magnesium, thus relieving the extra load on the system.

(4) A shorted casing, if repair is impossible, can be filled. ■

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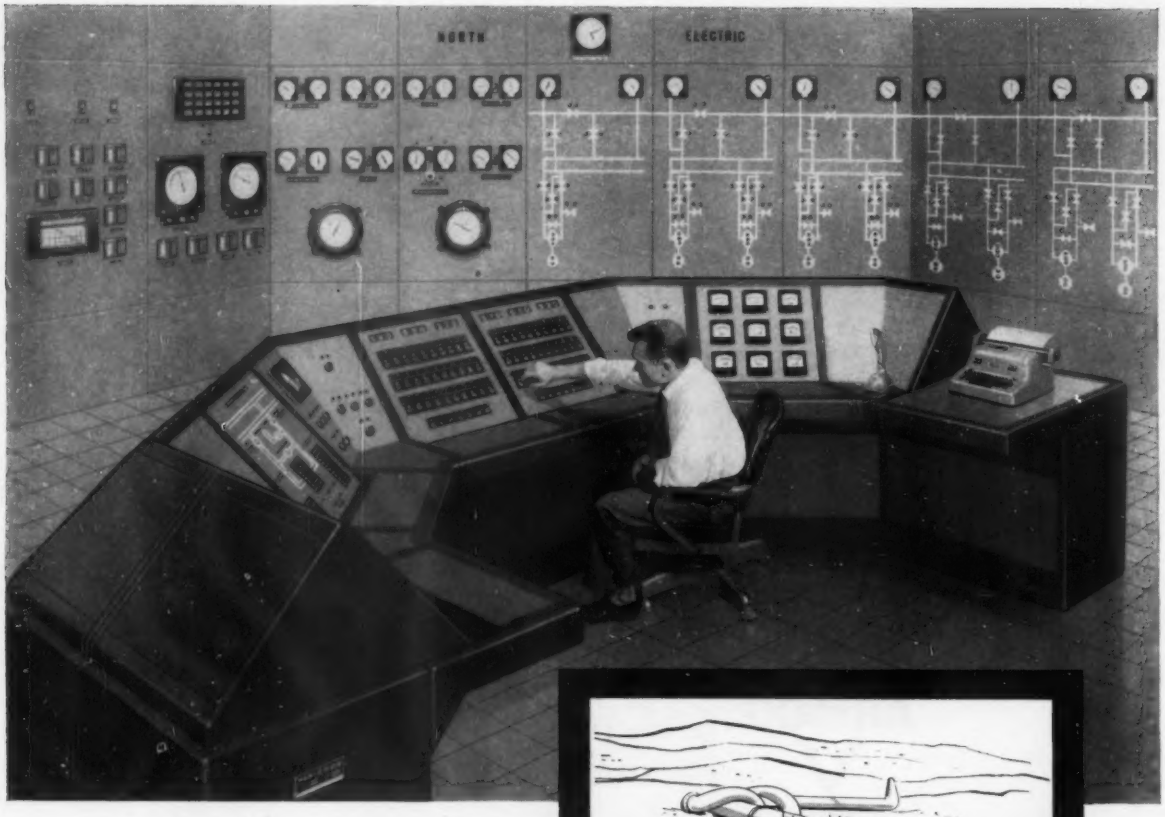
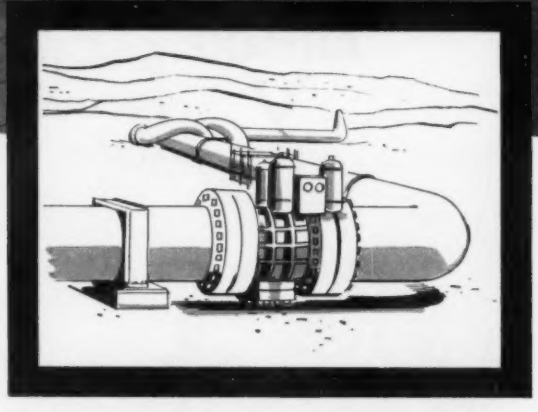


North's new PARICODE™ SYSTEMS will bring better pipeline control to your operation



North's new PARICODE system has been specifically designed for the pipeline transmission and petro-chemical industries—specifically designed to perform all the functions required of automatic control and supervisory equipment—specifically designed to be fail-safe and reliable over microwave and carrier channels, or any other communication channels (including mixed channels)!

North PARICODE systems, designed on North's integrated system concept, provide for automatic sequencing and load control; data logging, handling and display; telemetering of flow data; and operation of remote unattended compressor and booster stations.

North PARICODE systems are the natural result of imaginative engineering from the company with the greatest background of experience in automatic remote control system design and manufacture.

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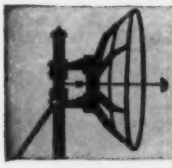
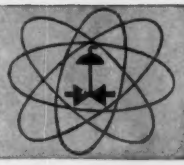


Communications and Automation



Edited by FRANK CHAPMAN

Sometimes we wonder why it works at all

By F. VINTON LONG

IT used to be that if we got through with our communications, at least part of the time, it was considered pretty good. However, now the need for reliability is greater than ever and without it our advances in tele-control of pipelines is greatly hindered. This also applies to the military. For instance, a 99 per cent efficient circuit, or in other words, a 1 per cent outage amounting to about 14.4 minutes per day, is unacceptable. By grim coincidence, this nearly 15-minute outage approximates the count-down time of an ICBM, the length of time it takes to scramble SAC, and the amount of warning we can expect from the Ballistic Missile Early Warning System.

There are many reasons why communications fail. Electronic equipment has become so familiar to us all that we tend to forget how remarkable it is that it works at all. The signal levels that must be detected, amplified and put to work, when considered in an absolute sense, are very tiny indeed. Very small variations in the value of a component are often sufficient to cause failure. Moreover, the electronic equipment is inherently ill suited for preventive maintenance. Little can be done to anticipate trouble and remedy it before equipment or component failures. Routine replacement is not the answer; certain components, particularly vacuum tubes, are more likely to fail early in their life than they are later. Load conditions are not suitable criteria for reliability; some tubes have better reliability under lighter than rated load, others under full load and some, it appears, are not reliable under any conditions of load. Solid-state techniques show many of the same difficulties.

Thus it appears that nothing in any other field can fail in such a bewildering variety of fashions. I have heard that one of the Major Air Commands found in a series of tests of its alerting system, a system which had direct lines to each of its bases in the United States, that the entire system functioned perfectly only 7 per cent of the time. In other words, 93 per cent of the time the commander failed to raise one or more of his subordinate bases because of the communications failure. Even the trans-Atlantic cables have their troubles, and they have been engineered to give an absolute minimum of outages. However, I have heard that between 1959 and 1960, there were 12 cable breaks in the Atlantic, including one of the coaxial telephone cable.

Those of us in the communications business sometimes cannot help but feel that we are up against some law of behavior that is working in its inexorable way to reduce the reliability of our communications. The "Theorem of the Inherent Perversity of the Inanimate Object" has been blamed.

This theorem advances that inanimate objects inherently behave in a perverse fashion. It is the working of this theorem that causes heads to turn off screws, zippers to jam and windows to stick.

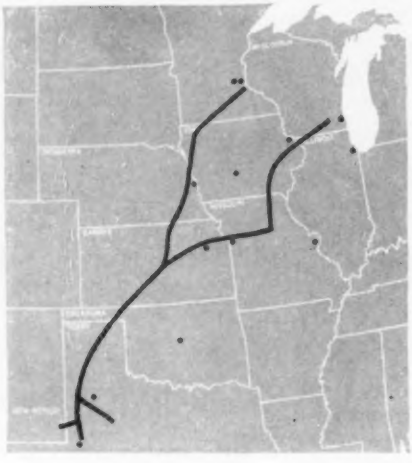
Unquestionably Murphy's Law is also a factor. Murphy's Law is the law advanced by one M/Sgt. Murphy, a crew chief of many years experience in an air force plane. He stated that "If there is any way a part can be improperly installed, someone will improperly install it." There is another quotation by a M/Sgt. in the air force and it is called the Dabnovich axiom, "If it works, don't fix it." Application of this principle has in the air force, I understand, in some instances reduced outages by as much as 30 per cent.

On top of these two human factors there must be some other factor that is working against us, and it is called "The Mathematical Factor." We refer to the over-all efficiency of a number of links in series. Simply stated, the probability of a number of events occurring simultaneously, or one after another in series, is the product of their individual probabilities. Hence, the probability of all three links being operational when each one individually has a .9 probability of being operational is .9 x .9 x .9 or .729. As one can readily see, the probability of several events occurring simultaneously is considerably less than the probability of any one of them occurring. Anyone who ever tried to make 8 "the hard way" can attest to this. By their very nature, communications are susceptible to many failures caused by this mathematical principle. It is inexorable and we might as well accept it.

However, having discovered that the mathematics of probability frequently work against us, is there any way of putting them to work on our side? We think there is. The obvious way to approach this is to put reverse English on the problem to minimize the probability of failure. How do we do this? Simple enough, just design the system so that several routes must fall simultaneously in order to have complete

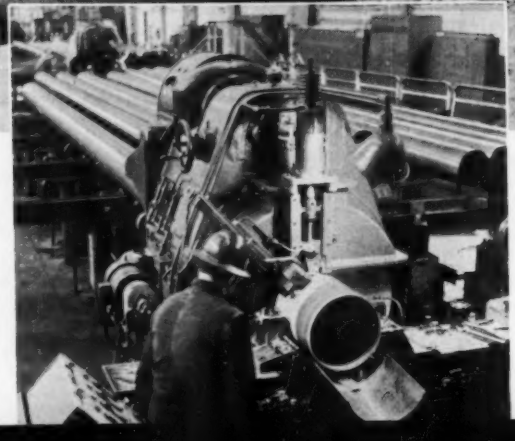
Continued on page 110

Bethlehem Line Pipe Performs for Mid-America Pipeline



For this 2,200-mile LPG pipeline, Bethlehem furnished some of the longest line pipe on record. Lengths of the 8-in., X52-Grade pipe reached to 62 feet! That's mighty long pipe. And every inch of it is top-quality . . . the kind that keeps pipeliners moving at top speed.

▲ *In a Kansas field, Bethlehem pipe waits for the stringers. Extra-long lengths, squared ends, and accurate bevels mean fewer and faster welds, smooth installation.*



Bethlehem Electric Resistance-Weld line pipe *is produced on modern facilities at our Sparrows Point, Md., plant in sizes from 5-9/16- to 16-in., OD, in lengths to 62 ft.* ▶

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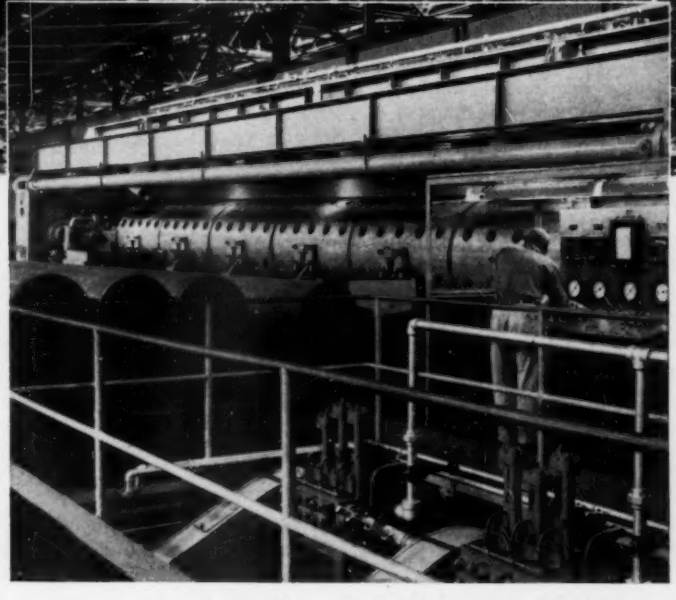
▲ *Williams Brothers Company, Tulsa, engineered and constructed the line for Mid-America Pipeline Company, also of Tulsa.*



Electric Fusion-Weld line pipe *facilities, newly-installed at Bethlehem's Steelton, Pa., plant, turn out pipe from 18 through 42-in., OD, with walls to 3/4-in. in all diameters.* ▶

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communications • *Cont'd.*

from page 107

system failure. Let's try three circuits again, this time in parallel with each having a probability of .9 of operating. Since the probability of functioning, the former is equal to 1 - .9 or .1. If over a given path we have three independent routes each having a probability of the simultaneous failure of all three or .1 x .1 x .1 or .001; we now have a 99.9 per cent system. This begins to look like we are getting somewhere. In fact, if we have one of our paths a .9 circuit, another a .7 and another a .6, their respective probability of failure being .1 x .3 x .4, or .012 or a 98.8 per cent probability of successful communications. Even addition of several poor circuits may be well worthwhile in terms of the over-all system reliability gained.

Of course, something that would destroy either terminal would have the effect of nullifying all of the paths. But then if the terminal is destroyed, there probably would be no one having a need for communications anyway. The only catch in the problem is that the paths must be truly independent so that the same interruption cannot affect more than one. Of course, there are various degrees of independence and any degree of interdependence will tend to reduce the pure probability advantages. However, we should attempt to maximize independent circuitry in all our planning. Provision of multiple media of transmission (cable, microwave, etc.) between the same two points is a good way to do this and can allow system reliability far in excess of that possessed by any one of the media.

In this imperfect world of ours, there seems to be no solution to the problem of providing reliable communications except through the application of the laws of probability, making maximum use of redundancy and duplication. It is for this reason, that we must hold on to some less efficient circuits even after much higher quality facilities are available. Only by providing the maximum number of independent routes between two points can we make probability work for us. We then require the simultaneous failure of many elements before we have total system failure—as we have seen, a very unlikely event.

A lot of the material contained herein was lifted from a paper by Col. L. C. Sheetz, USAF. ■

Gassing Game

Cont'd from page 21

the fixed area prices come close to approximately current maximum prices, which have more than doubled in the past five years."

Here Landis seems to exhibit both a disregard for the facts and a sad misconception of consumer needs, one producer says. Federal Power Commission experience has probably taught the commissioners, he adds, that consumers need an adequate supply of gas as well as reasonable prices and that only by fair prices can incentives to seek more gas be provided for explorers. But the fact remains that the consumers do prefer gas to coal or oil and that it is important to them that a safe margin of supply be maintained.

Although Landis implies that the commission rejected a rate base approach which would result in lower prices for gas consumers, most producer lawyers disagree. They say the commission knows that the use of such an approach would have resulted in higher gas prices and they add that the point is well documented in the Commission's Phillips Opinion No. 338.

Producers say Landis' statement about gas prices doubling in the past five years is simply not true, whether such prices are considered only in new contracts executed over the five-year period, or as the average of all contract prices. For instance, one producer pointed to Bureau of Mines statistics as the authority for the fact that for the period 1955-59 the average field price for all gas increased from 10.4 cents per Mcf to 12.9 cents per Mcf. Not only, he said, is this not a doubling of prices in the past five years, it does not keep up with some increases in average prices of other commodities and fuels.

The fact is this increase is conservative when it is considered that until a very few years ago natural gas had virtually no market and consequently no value. It was like gasoline, which was burned in swamps and creek bottoms, before the automobile gave it a value.

As one producer put it, under these circumstances it would not have been surprising if gas prices had increased to the extent exaggerated by Dean Landis.

When Landis referred to participation of state utility commissions in FPC proceedings and cited that as proof that the FPC had no regard for the protection of the consumer interest, the point was offset by a producer who said that not only state regulatory bodies but the states themselves in producing states have frequently intervened to contend that the commission is arbitrarily holding down field prices of gas.

These producer state authorities he said, contend with as much logic as Landis uses on the other side that the FPC has gone too far in holding down producer prices and have thereby jeopardized state revenues, university funds, the property of citizens, and several important public school funds.

There were a few things Landis had to report that met with producer agreement. For instance, they think his suggestion of dividing the duties of the commissioners and doubling the work load by increasing the commission to seven members has much merit.

Landis was also given credit for attempting to find an answer to a most perplexing problem. But producers generally believe he relied on unreliable and even biased sources for his direction. None seemed to doubt his good intentions, but they did doubt the wisdom of some of his remarks concerning the FPC. While producers themselves have been highly critical of the FPC on many occasions, they say they have tried to keep their criticism within the bounds of fairness.

This, they say Landis, either wittingly or unwittingly, did not do. ■

A MATTER OF CONTROL

In the Orient the cormorant industriously catches as many fish as it can. But its masters put a ring around its neck to prevent it eating what it catches. It's a matter of control. Yet you can be sure the master gives the cormorant enough fish to sustain healthy life and growth. Some for the master; some for the cormorant. Otherwise, no fish for anyone!

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SUBSIDIARIES: Midwestern Gas Transmission Company • East Tennessee Natural Gas Company • Tennessee Life Insurance Company • AFFILIATE: Petro-Tex Chemical Corporation

the highly critical study of all regulatory agencies by James M. Landis, made for the then President-elect Kennedy. The other was issued earlier by the staff of Rep. Harris's Oversight subcommittee.

The Harris subcommittee staff report was, indeed, mildly critical of some FPC practices. It was critical of long delays in rate hearings; it claimed the agency was not properly prepared to handle regulation, questioned that the area-pricing policy would be approved by the courts, and said the commission fails to properly examine cost figures submitted to it.

Six specific suggestions called for: Extending the waiting time when proposed rates could be put into effect to 18 months; outlawing multiple rate hikes; requiring 40 per cent reserves for rate refunds, and requiring open records of negotiated settlements.

In passing, the staff also said it found nothing improper in the contracts between Midwestern Gas Transmission Co. and the commissioners, probed last year. (Chairman Harris during the hearing expressed an opposite impression.)

The report generally was critical only of some practices within the current framework of the agency—a sort of reprimand from within the family.

Not so the Landis report to the new President.

In statements sharply critical of all of the independent agencies, the Landis report reserved its harshest fire for the FPC.

It called for creating a seven-man commission (two more than at present) "with consumer interest at heart."

The commission has failed to formulate a policy of regulating natural gas producers (one of its "outstanding failures in the regulatory field"), the report charged.

It accused the commission with a "patent failure" to execute laws requiring regulation of gas production while hoping that legislation would be passed to remove this requirement. This, Mr. Landis said, is "rightly a matter of constitutional concern" to the President.

The commission, the report lashed out, represents "without question the outstanding example in the federal government of the breakdown of the administrative process." The problems arise from an "unwillingness of the commission to assume its responsibilities under the Natural Gas Act and its attitude, substantially contemptuous, of refusing in substance to obey the mandates of the Supreme Court of the United States and other federal courts," it contended.

The Landis report in effect supported proposals — principally by Sen. Paul Douglas (D., Ill.)—to exempt small producers from federal control as a method of clearing the present backlog of cases and "coming to grips with the relatively few remaining producers who do matter."

After fuming at the commission, the Landis report noted that the solution might be to remove gas industry jurisdiction from the FPC and give it to another agency, although noting "it is probably unnecessary to go this far."

At the nub of the Landis report was the recommendation that an "overseer" of these agencies be created in the White House. This was interpreted as a move to pave the way for taking control. The term "czar" was applied to the proposal, and the resulting furor caused Mr. Landis, who took the post himself, to back down. He then explained he meant only a person who would speed the handling of decisions, suggest improved procedures, draft reorganization plans for the agencies to help speed their work, and see that decisions are expedited.

(This concept was somewhat in conflict with a criticism Landis made in his report of too much White House pressure on these agencies in the past.)

On one point, all seemed agreed: New legislation should be passed imposing stiff restrictions on ex parte contacts between industry and the commissions. Bigger budgets and staffs were also frequently suggested.

Some of the interparty fighting may be ironed out in private, rather than in the public eye. But chances are good that any compromises made in private will break down in the heat of congressional debate. The gas industry will suffer.

FPC heads for trouble

FEDERAL POWER COMMISSION'S area pricing approach is getting deeper and deeper in trouble.

Producers in at least one area of Texas are now undertaking a determined drive to knock out the differentials between new and old sales. This appears headed for the courts, long before the commission appears to be ready to remove the differentials.

There are strong indications that the courts are going to frown on the area-pricing approach. The Circuit Court of Appeals in Washington, D. C., in December sharply criticized the commission for not holding down gas prices in two cases—prices which matched the subsequently-set area prices. It sent the two cases back to the commission for rehearing.

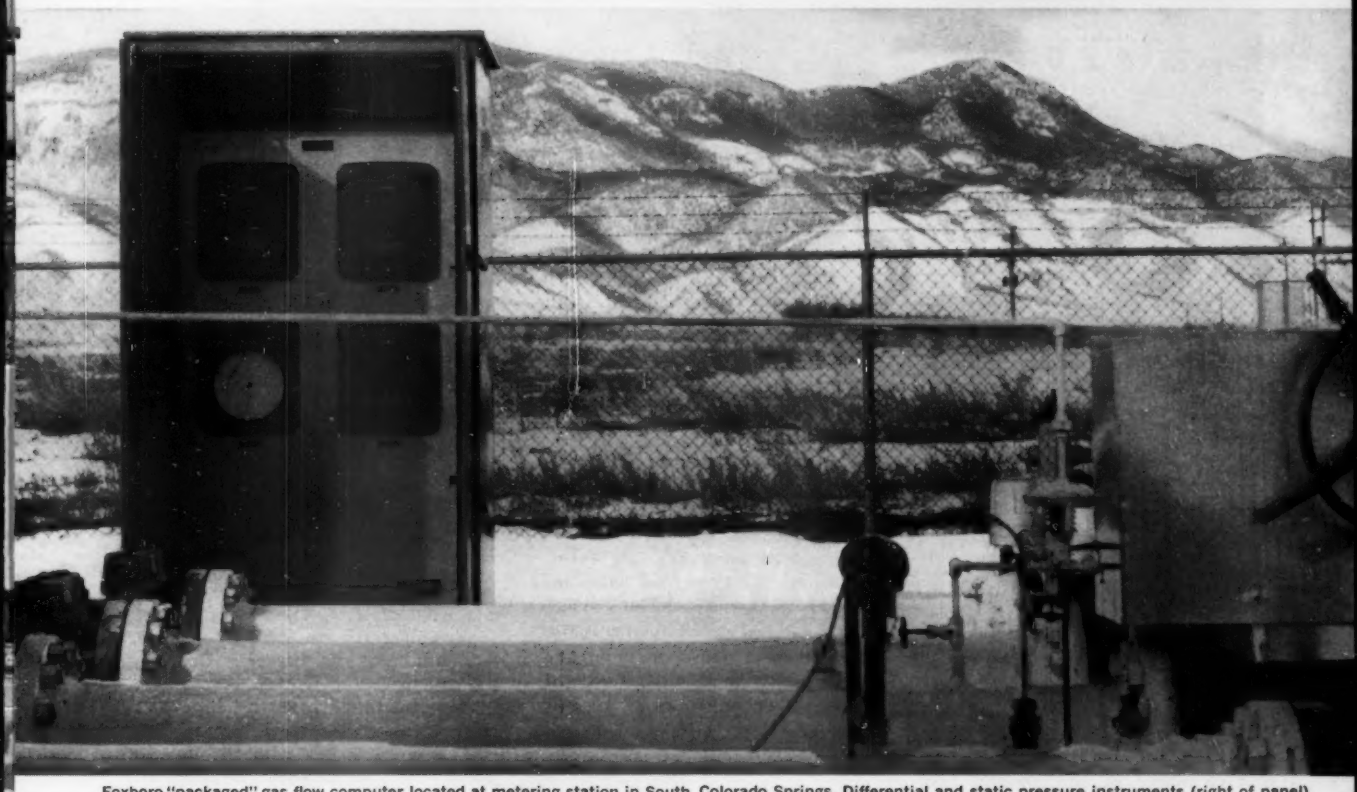
Noting that the U. S. Supreme Court in the CATCO case last year instructed the FPC to review initial gas prices and condition them if they appear too high, the Circuit Court judge said:

"We believe that the Supreme Court meant to impress upon the commission an interpretation of the 'public interest' which in the context of a rising natural gas market, demands a real administrative effort to hold back prices."

There was nothing in the record of the two cases, the judge continued, "which would justify the conclusion that the commission has adequately performed this duty."

The court, noting that the price was set in one case apparently because of the fear the deal would fall through unless it did, sharply rapped the commission. The FPC cannot abdicate its responsibility to regulate prices "because the parties tell it that the transaction will collapse unless the full price is approved," it noted.

This Colorado Interstate Dispatcher is reading gas flow data from four different states...



Foxboro "packaged" gas flow computer located at metering station in South Colorado Springs. Differential and static pressure instruments (right of panel) convert measurements to electrical inputs for the Dynalog* Computer-Telemeter (lower left). Instrument at upper left telemeters down-stream gas pressure.

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PLGS

W. M. JACOBS has been elected president of Pacific Lighting Gas Supply Co., succeeding ROBERT A. HORNBY, who was named chairman of the board. Hornby succeeds ROBERT W. MILLER, who resigned as board chairman of PLGS but remains as board chairman of Pacific Lighting Corp., parent of PLGS, and of Southern California and Southern Counties Gas companies. Hornby also will continue as president of the parent company. Jacobs has been senior vice president of PLGS for the past two years. He has served as vice president of Pacific Lighting Corp. since 1956 and continues in that post.

ESKIL I. BJORK retires next month as chairman and chief executive officer of the Peoples Gas Light & Coke Co., Chicago. Succeeding him will be REMICK MCDOWELL, currently serving as president and a director of Peoples Gas. LESLIE A. BRANDT moves up from comptroller and a vice president to the presidency. Bjork recently completed 40 years with Peoples Gas. After his retirement as chairman and chief executive officer, Bjork will continue as a director and will serve as chairman of the executive committee.

Other changes at Peoples Gas: WARD C. MCCALLISTER to a vice presidency and comptroller; WILFRED G. PILGRIM, an assistant vice president and continuing as assistant comptroller; ELMER F. SCHULDT to assistant vice president, operation division, succeeding JOHN J. NOVY, who is retiring; ALLAN J. GOOD, assistant vice president, finance and public relations division; WILLIAM H. HOLLWEG, treasurer and assistant secretary; EDWIN M. TABER, secretary and assistant treasurer.

DANIEL M. BAILEY from vice president of Continental-Emsco Co. to executive vice president, Southern Union Gas Co., Dallas.

FRANK WEBB named sales manager for the northeast district, Ponca City, for Oklahoma Natural Gas Co., Oklahoma City.

DONALD SKOGSETH named manager of Northwest Natural Gas Co.'s new mid-Willamette Valley district in Albany, Ore.

RAYMOND H. HELLER named general manager of Robertshaw-Fulton's Aeronautical & Instrument division, Anaheim, Calif.

JOY WEIS from home service advisor of Ohio Fuel Gas Co. at Marion to district home service director for Ohio Valley Gas Co. at Steubenville; DONNA HOLCOMB named home service advisor in Parma for OFG.

MALCOLM M. CHESNEY JR. promoted to manager, economic research department, Brooklyn (N. Y.) Union Gas Co.

HENRY M. SAUBERT from president to chairman of the board; EARLE E. GARRISON to president and chief executive officer; and J. PATRICK LANNAN from board chairman to chairman of the executive committee, all of Great Falls (Mont.) Gas Co.

STANFORD D. ANDREWS moves from General Controls Co. to Deutsch Controls Corp., Los Angeles, as general manager.

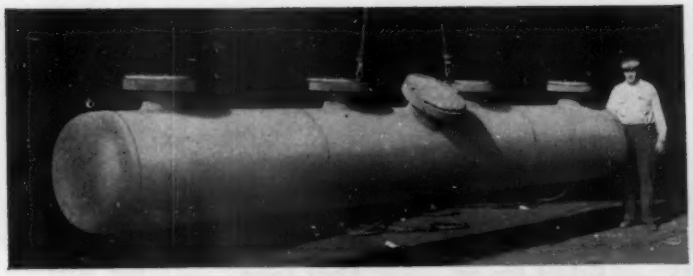
W. A. SMITH named industrial service manager, J. I. Case Co., Racine, Wis.

ROBERT J. OWENS from safety administrator to safety engineer, Pacific Gas & Electric Co., San Francisco, and GLENN A. MERRITT from automotive safety supervisor to assistant safety engineer.

JOHN E. TAYLOR elected vice president of Arkansas Industrial Pipeline Corp.; DAVE E. SULLENBERGER elected vice president of Arkansas Louisiana Chemical Corp.; and ROBERT E. WELLBORN elected to the board of directors of Reynolds Gas Regulator Co.—all Arkansas Louisiana Gas Co. subsidiaries.

AL GOULD from free-lance public relations and advertising counseling in Portland, Ore., to news director, Northwest Natural Gas Co., Portland.

PETER J. REMPE from president to chairman of the board and chief executive officer and LUCIUS S. STORRS JR. from executive vice president to president, Stone & Webster Service Corp., New York.



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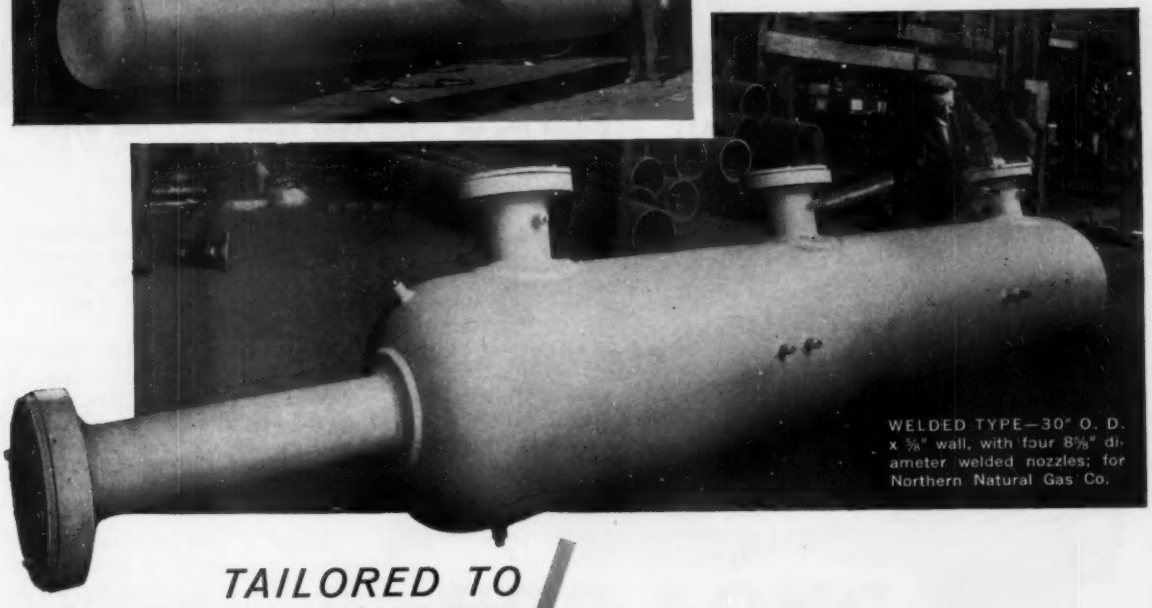

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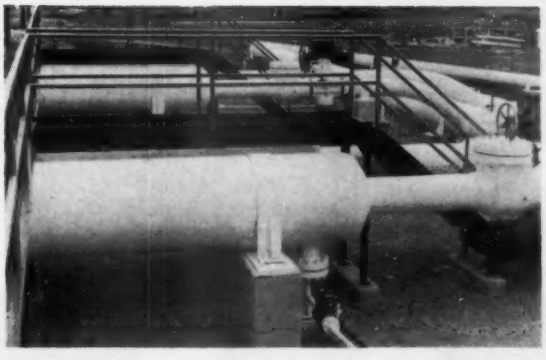

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Paul Magnitzky
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Alton Beck
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Arthur Baitz
Robertshaw

RICHARD L. FITE JR. from vice president of Lynn Gas & Electric to vice president and manager, Mystic Valley Gas Co., Malden, Mass. Also, ALBERT K. PEIRCE from assistant superintendent of utilization to superintendent of utilization; G. PAUL MAGNITZKY from vice president and director of Wachusett Gas Co. to assistant manager of Mystic Valley; and GEORGE C. AMBROSE from commercial representative to manager of commercial and industrial sales for Mystic Valley Gas.

JACK A. BELL from executive vice president to president and director; FRANK D. FOLEY SR. from president to chairman of the board; CHARLES K. OXFORD named first vice president, S. C. BISHOP named vice president and treasurer, JACK M. AVERETT named vice president-engineering, and MILDRED N. PEARSON named secretary—all of the Gas Light Co. of Columbus, Ga.

ALTON W. BECK from vice president, marketing, to vice president, western operations, and ARTHUR G. BAITZ from director of engineering planning, to director of marketing, Robertshaw-Fulton Controls Co. Beck will headquarter in Anaheim, Calif., Baitz in Richmond, Va.

HAROLD WOLPMAN from vice president-plant engineering to senior vice president and WALTER L. CONNOLLY from director general of the French subsidiary to vice president-manufacturing, Grove Valve & Regulator Co., Oakland, Calif.

FRANK FREER JR. from comptroller to vice president and comptroller, and JACK V. RICHARDS from general staff manager to general manager of the gas department, Public Service Electric & Gas Co., Newark, N. J.

ROBERT J. OTT from sales representative to southern section manager (Louisiana, Mississippi, Alabama, Georgia, Florida), Mueller Co., Decatur, Ill. Ott headquarters in Atlanta. JACK L. CHILTON succeeds Ott in Georgia and western Alabama. Also, J. WILLIAM COFFEY has been assigned to the Midwest section — Minnesota and North and South Dakota.

CURTIS N. TANNER from supervisor, drafting section, to safety engineer for the Oklahoma-Kansas division of Arkansas Louisiana Gas Co. in Oklahoma City.

FRANK COOK from manager of the Hutchinson, Kan., division to manager of the Joplin division of Gas Service Co., succeeding RALPH L. WEIR, who is retiring.

EDWARD MANION from engineer to superintendent of Gas Service Co., Joplin, Mo.

Thomas Rennell
Northampton Gas

Paul Reynolds
Northampton Gas

R. C. Smith, Jr.
North Shore Gas

C. Schofield, Jr.
Lynn Gas

M. C. Macauley
Wachusett Gas

R. S. DIGGS to assistant superintendent of the transmission and distribution engineering division and R. L. COLE to assistant general superintendent of transmission and distribution in the Philadelphia division, Philadelphia (Pa.) Electric Co.

W. G. WALKUP named gas superintendent, Schuykill division, Philadelphia Electric Co.

JOHN A. SCHLUTER and JACKSON KEMPER elected to the board of directors of Mueller Co., Decatur, Ill.

EMIL L. BANGERT retired as controller at the AGA Laboratories, Cleveland.

The following changes have been announced by Minneapolis-Honeywell Regulator Co.'s Industrial Products group: NILSSON S. BASSETT to the Federal Services group in Washington; JOHN O. PAULL succeeds Bassett as sales manager of the Industrial Systems division. Paull is succeeded as industrial sales manager of the Pacific region in Los Angeles by J. F. SMITH. R. E. HARRIS, district manager at Tulsa, succeeds Smith as Southwest regional industrial sales manager at Dallas.

ANDREW L. SCHUYLER from applications sales engineer to boiler product manager, Bryant Manufacturing Co., Indianapolis, Ind.

JOHN J. DOLAN retires as vice president for industrial relations of Milwaukee (Wis.) Gas Light Co.; NICHOLAS LESSELYOUNG, general counsel and secretary, succeeds Dolan.

PAUL J. REYNOLDS named vice president and manager and THOMAS H. RENNELL named general superintendent, Northampton (Mass.) Gas Light Co.

ROBERT C. SMITH JR. from commercial-industrial supervisor of Mystic Valley Gas Co. to assistant manager for North Shore Gas Co., Beverly, Mass.

CARL W. SCHOFIELD JR. from vice president and director of Northampton Gas Light Co. to vice president and manager, Lynn (Mass.) Gas Co.

MALCOLM C. MACAULEY from assistant manager, North Shore Gas Co., to vice president and manager, Wachusett Gas Co., Leominster, Mass.

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DAWES WALTER from Atlantic Refining Co. to manager of advertising and public relations and RICHARD S. LEE from sales promotion manager of the Industrial Chemicals division to assistant advertising manager, Pennsalt Chemicals Corp., Philadelphia.

EDWARD B. MAIRE from general manager of the Mairco division to general manager of Robertshaw-Fulton's Bridgeport Thermostat division, Milford, Conn.

WILLIAM J. GREDE, president and chief executive officer, also named chairman of the board, J. I. Case Co., Racine, Wis.

ROBERT G. THIBAULT from comptroller to vice president-finance, Peoples Gas System of Florida, North Miami.

STEPHEN D. BECHTEL JR. from chairmanship of Canadian Bechtel Ltd. to president, Bechtel Corp., San Francisco.

HAROLD R. RIGGS named vice president of Crane Co., Chicago.

CLAYTON S. CRONKRIGHT from manager-area development to general manager-area development, Public Service Electric & Gas Co., Newark, N. J.

KENNETH G. KREUTER to director of engineering and RICHARD W. ZOLLINGER to manager, administrative services, Robertshaw-Fulton Mairco division, Goshen, Ind.

John Merriam
Northern

W. A. Strauss
Northern

W. J. Bowen
Transwestern

C. Fendrich, Jr.
Walworth

C. Schwarzler
Foxboro

Pipeline People

W. A. STRAUSS, executive vice president, moves up to president and principal operating officer of Northern Natural Gas Co., Omaha, succeeding JOHN MERRIAM. Strauss also becomes a director and member of the executive committee. Merriam remains as chairman of the board and chief executive officer. The office of executive vice president was not filled. The four senior vice presidents continue to report directly to Merriam.

W. J. BOWEN from senior vice president and director to president and J. FRENCH ROBINSON to chairman of the executive committee, Houston Corp., St. Petersburg, Fla.

KENNETH S. BAYLESS from vice president, sales, to executive vice president, Cal-Metal Pipe Corp. of Louisiana, Baton Rouge. He succeeds R. C. Stewart, who has resigned.

NED C. TURNER, vice president in charge of engineering and operations, elected to the board of directors of Transwestern Pipeline Co., Houston; RAYBOURNE THOMPSON to secretary; WILLIAM A. KOROS to treasurer.

DR. HARRY E. O'CONNELL from project engineer, Ethyl Corp., Baton Rouge, to project development manager, Tennessee Gas Transmission Co., Houston.

DONALD T. KOCH named manager of the new Detroit branch sales office of Cooper-Bessemer Corp., Mount Vernon, Ohio.

JAMES M. SPEES from assistant manager to manager of operations at the St. Paul (Minn.) plant and H. R. WESENBERG from sales manager to western district sales manager of the Gas & Coke division, Koppers Co. Inc.

CLIFFORD L. BENEDICT joined the compressor sales engineering force of White Diesel Engine division, White Motor Co., Springfield, Ohio.

C. WELLES FENDRICH JR. from marketing consultant with Stewart, Dougall & Associates to director of marketing research, Walworth Co., New York.

CHARLES SCHWARZLER named vice president of Foxboro Co.'s new marketing division; H. O. EHRISMAN named vice president and U. S. general sales manager; and V. V. TIVY named director of engineering.

EUGENE L. MCCARTHY from manager of oil field engineering to vice president in charge of product development and standards engineering, Black, Sivalls & Bryson Inc., Oklahoma City.

Harold Burrow
TGT

R. L. McVey
TGT

W. C. McGee, Jr.
TGT

Paul Bartley
BS&B

HAROLD BURROW from executive vice president to president; R. L. MCVEY from senior vice president to executive vice president; and W. C. MCGEE JR. to director, all of Tennessee Gas Transmission Co., Houston.

JOHN S. SHAW JR. named vice president-financial, Southern Natural Gas Co., Birmingham, succeeding HOWARD M. ERSKINE, retiring after over 30 years with the company.

ROBERT D. HUDSON from purchasing agent for Southwest Industries Inc. to a similar post with Transwestern Pipeline Co., Houston.

ROBERT E. MARSHALL, secretary and general counsel, also named treasurer and C. ROBERT MARANVILLE from manager, employee benefits to assistant treasurer, Worthington Corp., Harrison, N. J.

WALTER H. FELDMANN, president, named chief executive officer, succeeding HOBART C. RAMSEY, Worthington Corp., Harrison, N. J.

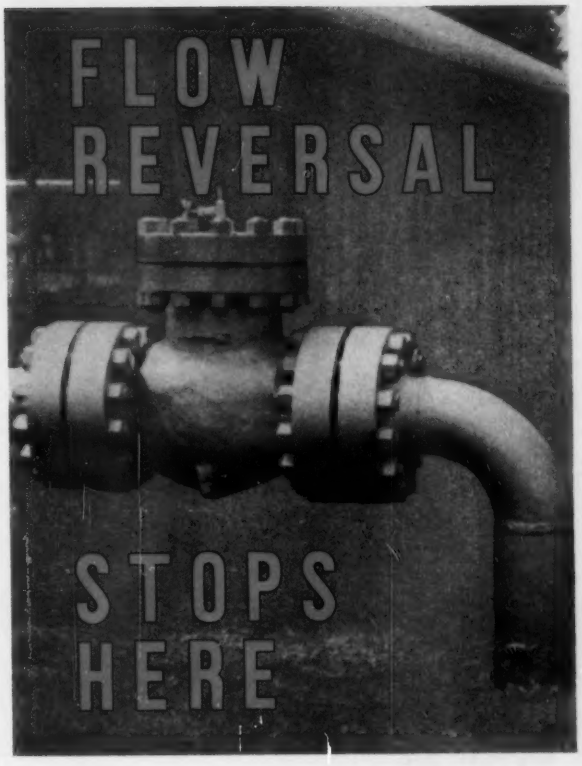
EUGENE MCCOY from programming analyst to assistant manager of gas engine compressor sales, Cooper - Bessemer Corp., Mount Vernon, Ohio.

PAUL BARTLEY from manager of oilfield equipment division to sales vice president of Black, Sivalls & Bryson's consolidated oilfield equipment and controls divisions. Also named are seven regional managers: FLOYD C. MYERS, a vice president, Gulf Coast region, Houston; LEE KELTON, Southwest region, Dallas; RALPH STEVENS, Mid-Continent region, Oklahoma City; L. E. JONES, Rocky Mountain region, Casper; AUSTIN LYON, Northeast region, New York; JAMES LEE, North Central region, Carmi, Ill.; and WILLIAM E. LACY, Western region, Los Angeles.

FRANK D. CHILDRESS named controller of Southern Pipe division, U. S. Industries Inc., Azusa, Calif.

WILLIAM S. BARNUM from assistant manager of sheet and strip sales to assistant manager of tubular sales, Kaiser Steel Corp., Oakland, Calif.

J. R. LYNE from vice president to general manager and director, Industrial Gas Supply Corp.



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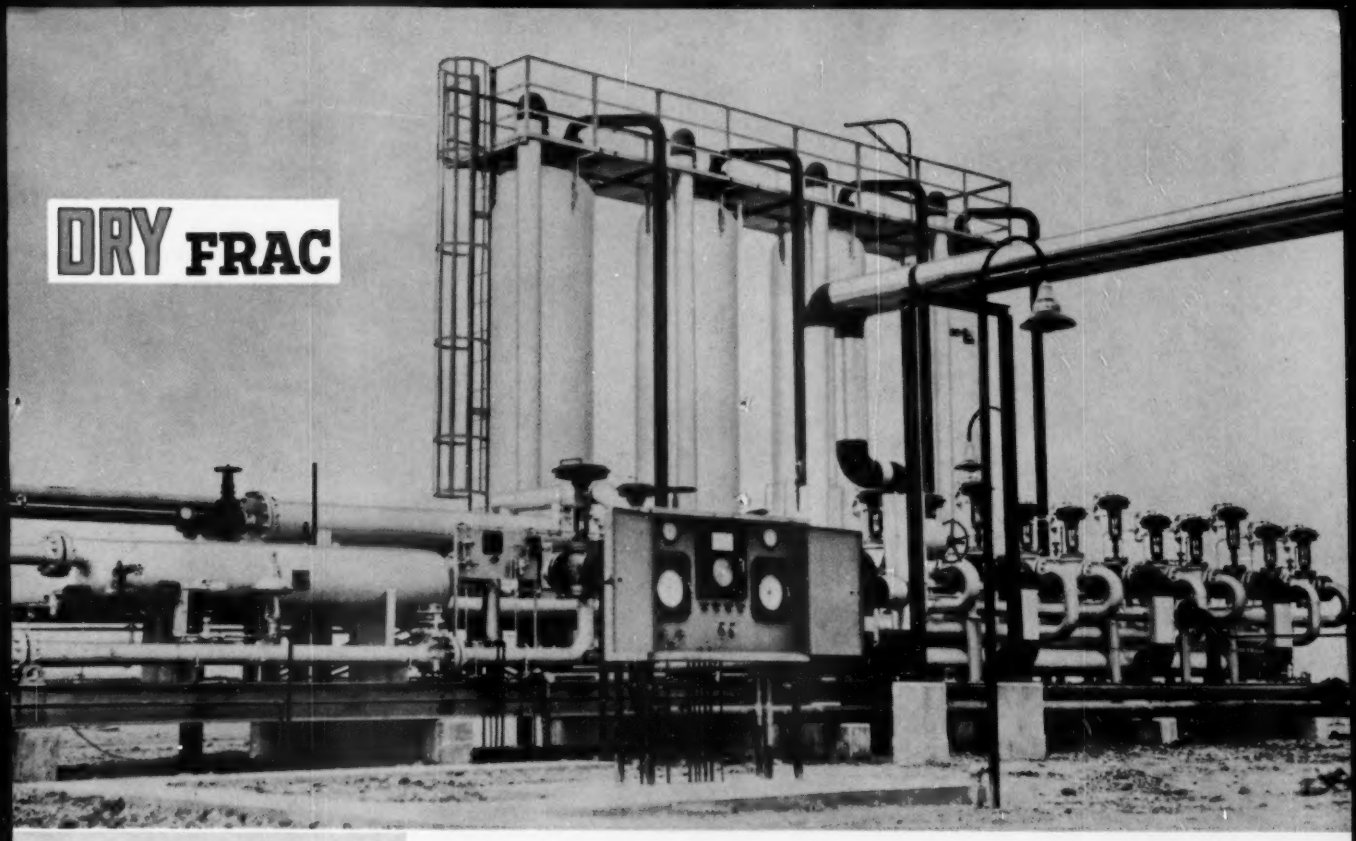

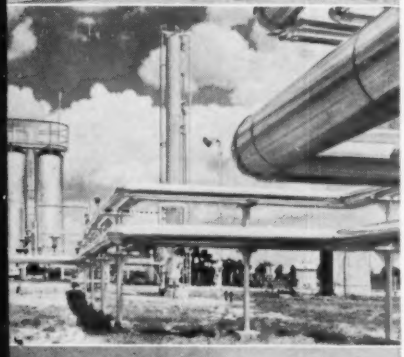

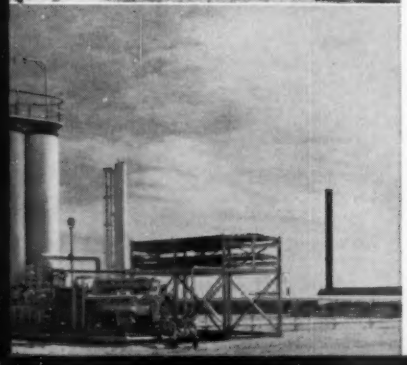

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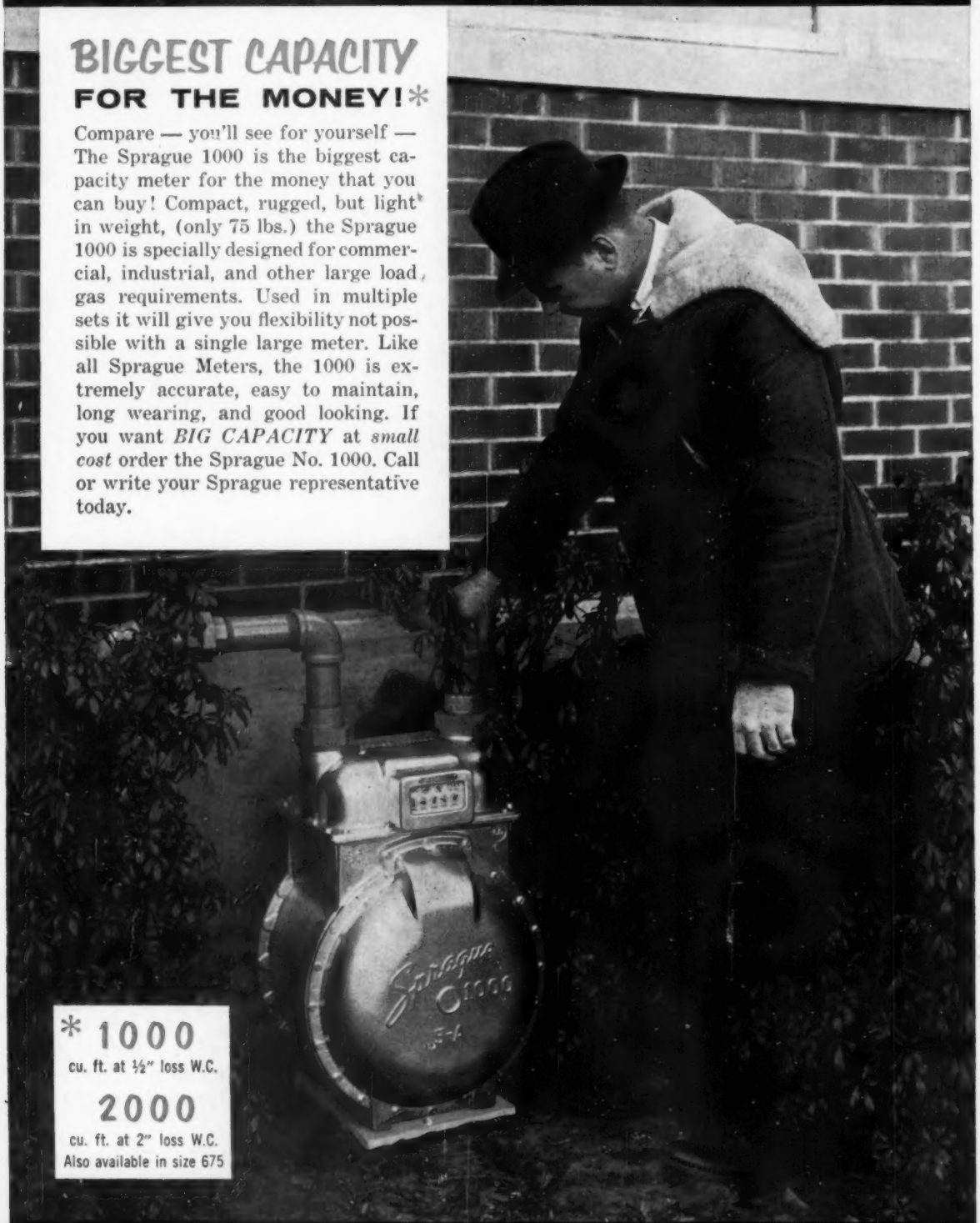

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